



RIPE NCC

RIPE NETWORK COORDINATION CENTRE

RIPE Database

Applications

Webinar

RIPE NCC Learning & Development



**This webinar is
being recorded**

Take the poll!

What do you know about
the **RIPE Database**?





Registering PA assignments

What is registration?

Filling in the inet(6)num template

Registering sub-allocations

What is a sub-allocation?

Using “mnt-lower:”

RIPE Routing Registry

aut-num objects

route(6) objects

as-set objects

Reverse Delegation

What is reverse DNS?

domain objects

Notifications

“notify:”

“upd-to:” and “mnt-nfy:”

The RESTful API

What is it?

How can I use it?



PA Assignments

How to register them

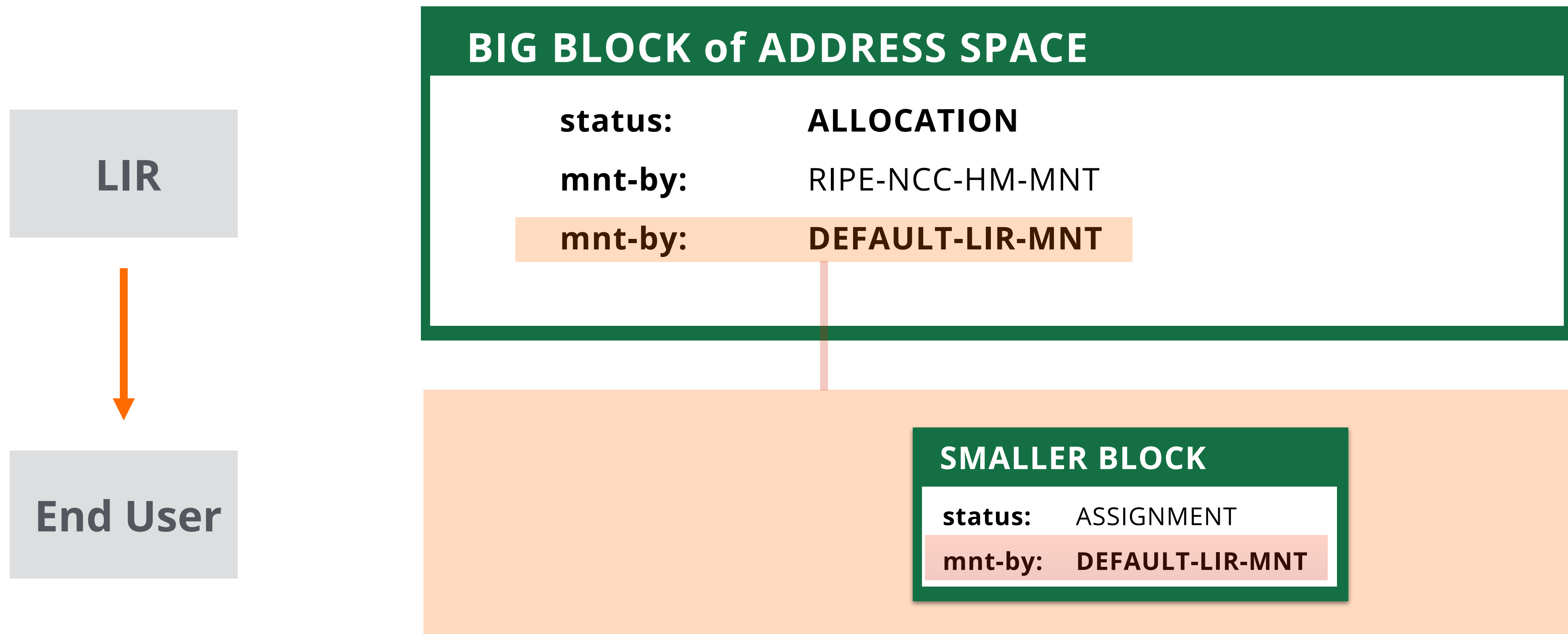


Take the poll!

Why do **you** register PA assignments?



Registering PA Assignments





inetnum: 10.1.0.0 - 10.1.3.255

mnt-by: RIPE-NCC-HM-MNT
mnt-by: **DEFAULT-LIR-MNT**
status: ALLOCATED PA

inetnum: 10.1.2.0 - 10.1.2.255

mnt-by: **DEFAULT-LIR-MNT**
status: ASSIGNED PA

inet6num: 2001:db8::/32

mnt-by: RIPE-NCC-HM-MNT
mnt-by: **DEFAULT-LIR-MNT**
status: ALLOCATED-BY-RIR

inet6num: 2001:db8:1001::/48

mnt-by: **DEFAULT-LIR-MNT**
status: ASSIGNED



inet6num: 2001:db8::/32

mnt-by: RIPE-NCC-HM-MNT
mnt-by: **DEFAULT-LIR-MNT**
status: ALLOCATED-BY-RIR

inet6num: 2001:db8:1000::/36

mnt-by: **DEFAULT-LIR-MNT**
status: AGGREGATED-BY-LIR
assignment-size: 48

inet6num: 2001:db8:1004::/48

inet6num: 2001:db8:1003::/48

inet6num: 2001:db8:1002::/48

inet6num: 2001:db8:1001::/48

inet6num: 2001:db8:1000::/48

mnt-by: **DEFAULT-LIR-MNT**
status: ASSIGNED



Filling in the Template

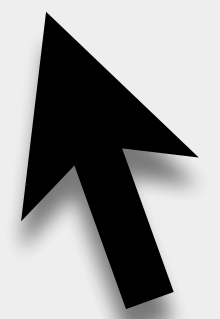
- Choose which maintainer will protect the new object
- Click on the **X** to remove a maintainer

Please enter the maintainers you would like to use as mnt-by

DEFAULT-LIR-MNT ★ | X

OTHER-MNT ★ | X

★ = Associated with your Access account





Filling in the Template

- Choose which maintainer will protect the new object
- Click on the **X** to remove a maintainer

Please enter the maintainers you would like to use as mnt-by

DEFAULT-LIR-MNT ★ | X



★ = Associated with your Access account



Same object structure for IPv4 and IPv6

Network

inetnum: IPv4 RANGE
inet6num: IPv6 PREFIX
netname: NETWORK-NAME

country: ZZ

Contact information

org: ORG-ZZ123-RIPE
admin-c: AD321-RIPE
tech-c: TE123-RIPE

Type of address space

status: ALLOC-ASSIGN

Protection of object

mnt-by: RIPE-NCC-HM-MNT
mnt-by: DEFAULT-LIR-MNT

source: RIPE



Object Creation Success

If the **values** in the object template are **correct**,
then the RIPE Database will **create** the object.

inetnum: 10.1.3.0 - 10.1.3.255

netname: LAIKA-NET-01
country: ZZ
admin-c: MB54321-TEST
tech-c: TP1-TEST
status: ASSIGNED PA
mnt-by: SM1-MNT



inet6num: 2002:ff01:1001::/48

netname: LAIKA-NET-01
country: ZZ
admin-c: MB54321-TEST
tech-c: TP1-TEST
status: ASSIGNED
mnt-by: SM1-MNT



Demo

Register an IPv4 PA assignment.





Questions





Sub-Allocations

Delegating to someone else

Take the poll!

Why would **you** delegate address space to someone else?

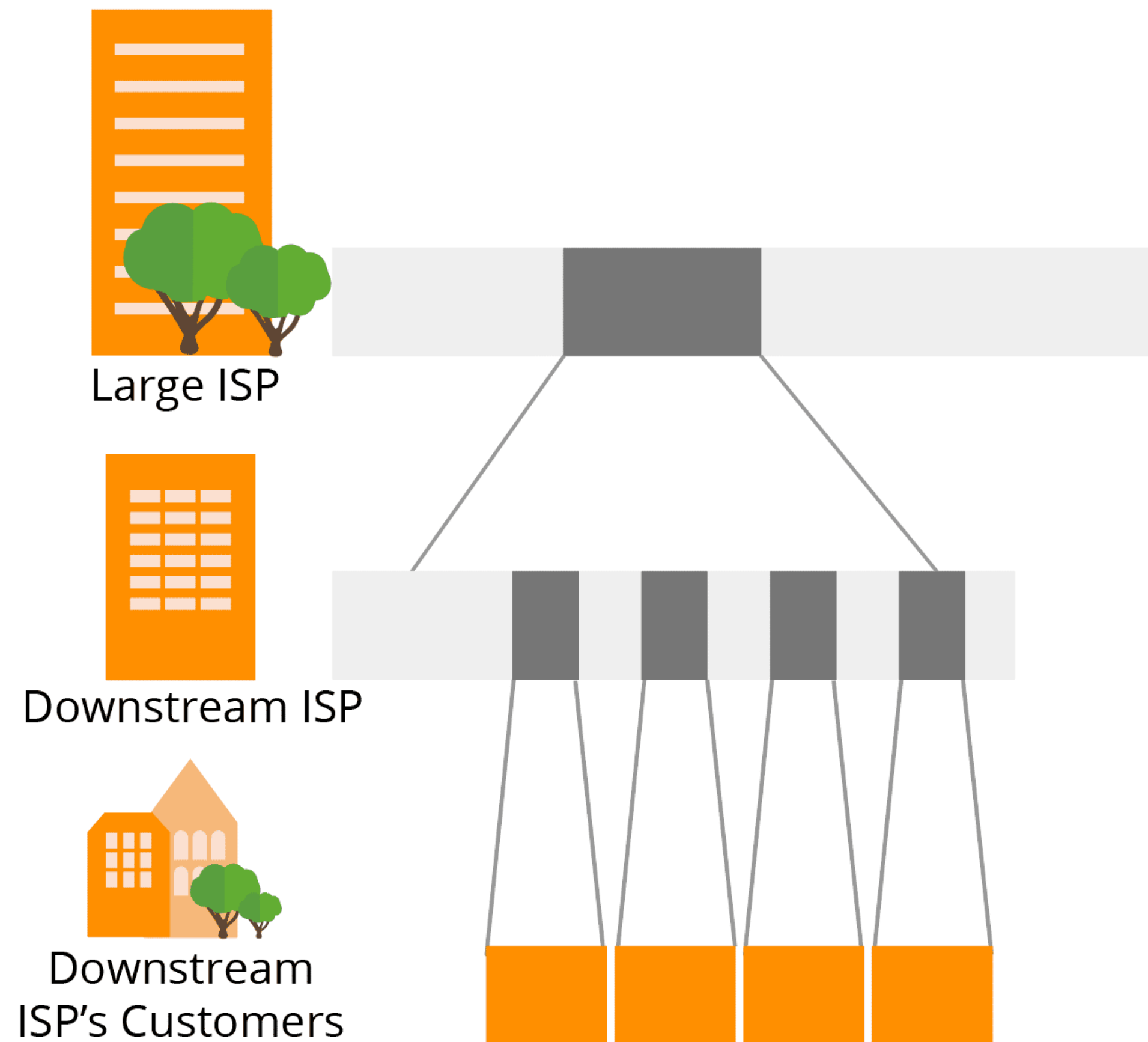




Sub-Allocations

Block for a downstream ISP

- ISP can register the assignments to its customers.
- Allows them to create their own route(6) and domain objects

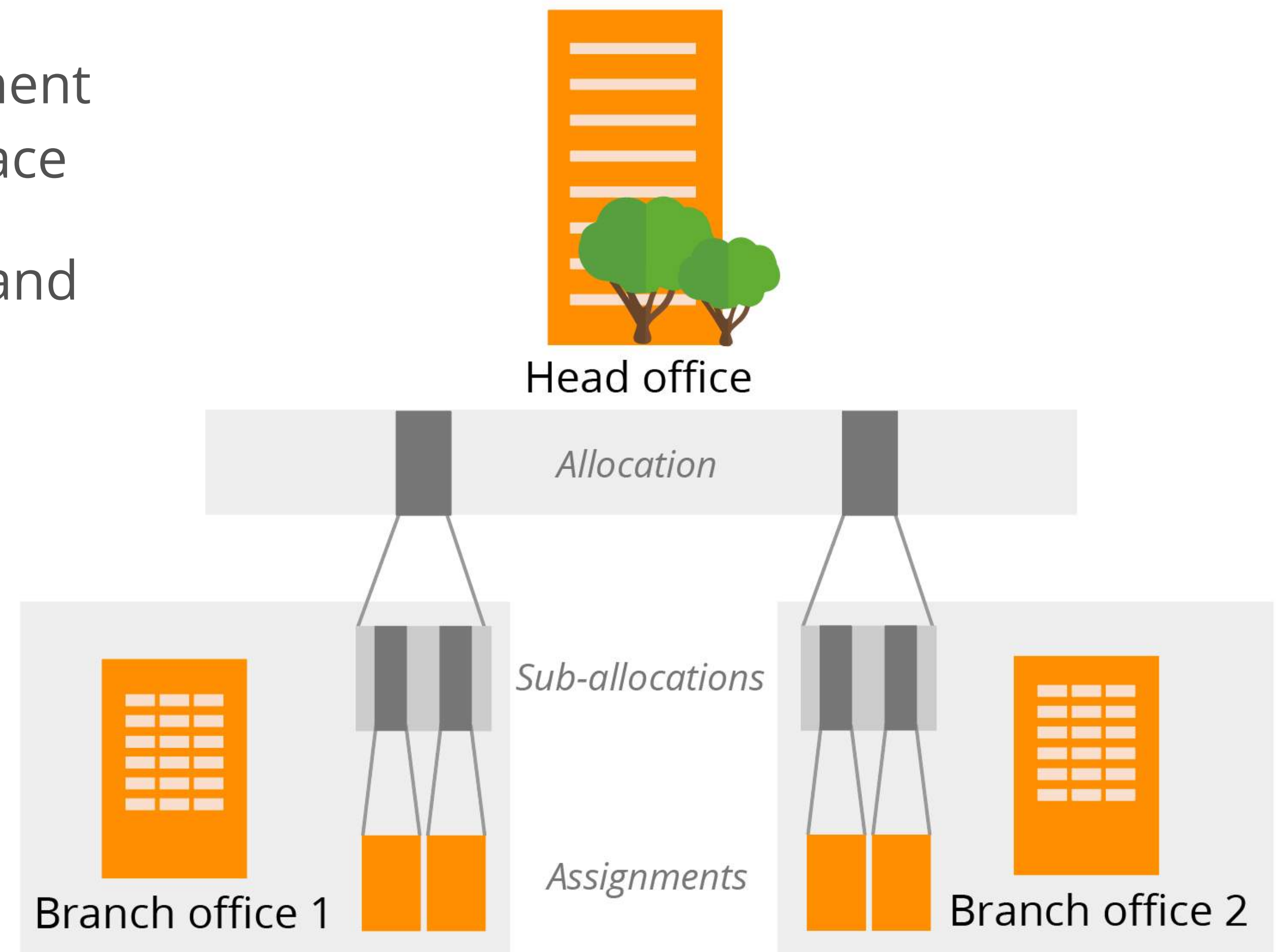




Sub-Allocations

Branch office or department

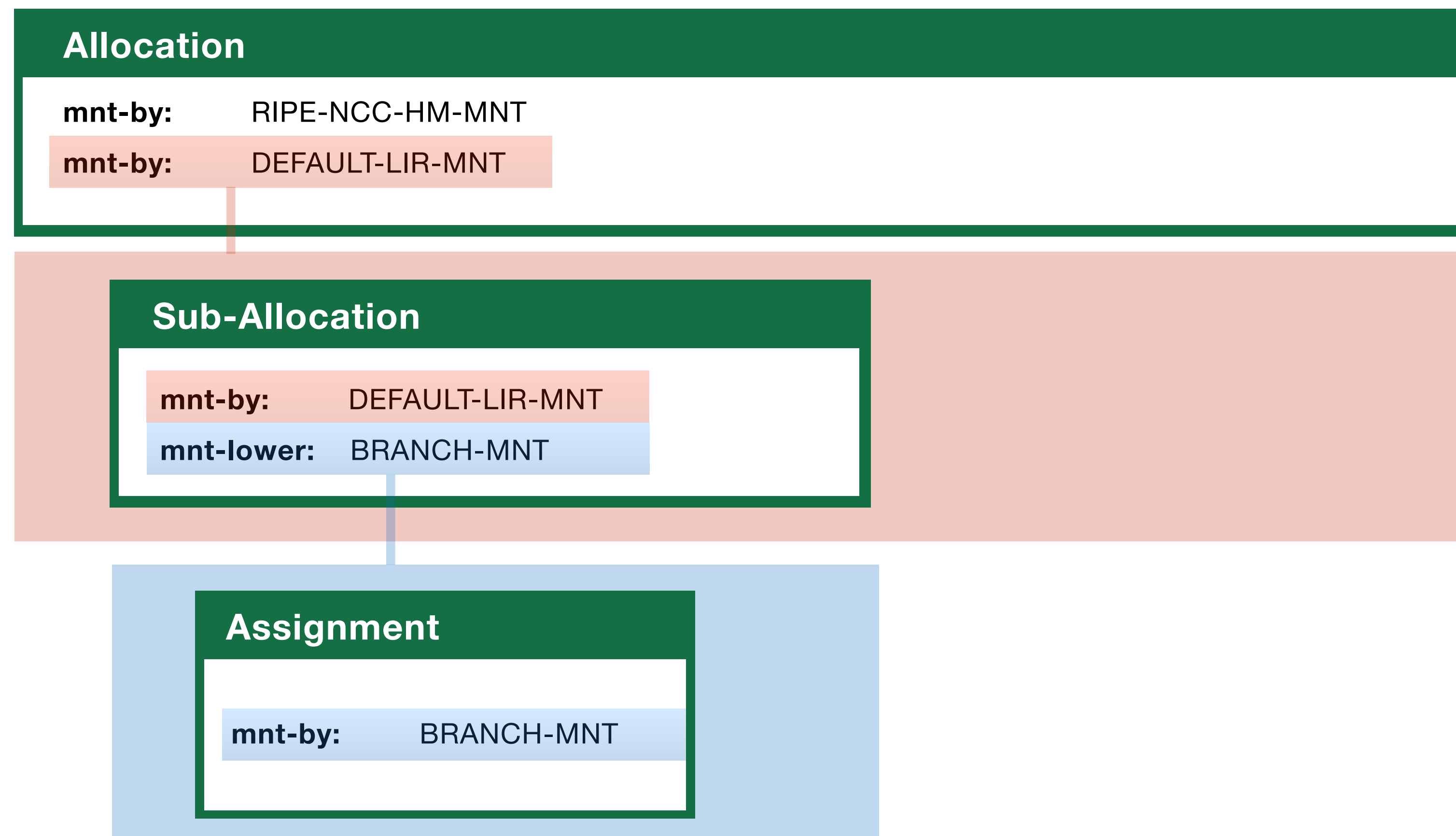
- Allows the branch office or department to control their block of address space
- They can create their own route(6) and domain objects





Delegating Control

“**mnt-lower:**” gives permission to create more specific objects.





Registering Sub-Allocations

Use the appropriate “**status:**”

IPv4 = SUB-ALLOCATED PA

IPv6 = ALLOCATED-BY-LIR

inetnum: 10.0.1.0 - 10.0.2.255	
netname:	Branch-office-1
country:	NL
admin-c:	LA789-RIPE
tech-c:	LA789-RIPE
status:	SUB-ALLOCATED PA
mnt-by:	LIR-MNT
mnt-lower:	BRANCH-MNT

inet6num: 2001:db8:a000::/36	
netname:	Branch-office-1
country:	NL
admin-c:	LA789-RIPE
tech-c:	LA789-RIPE
status:	ALLOCATED-BY-LIR
mnt-by:	LIR-MNT
mnt-lower:	BRANCH-MNT

Demo

Register an IPv4 or IPv6 sub-allocation.

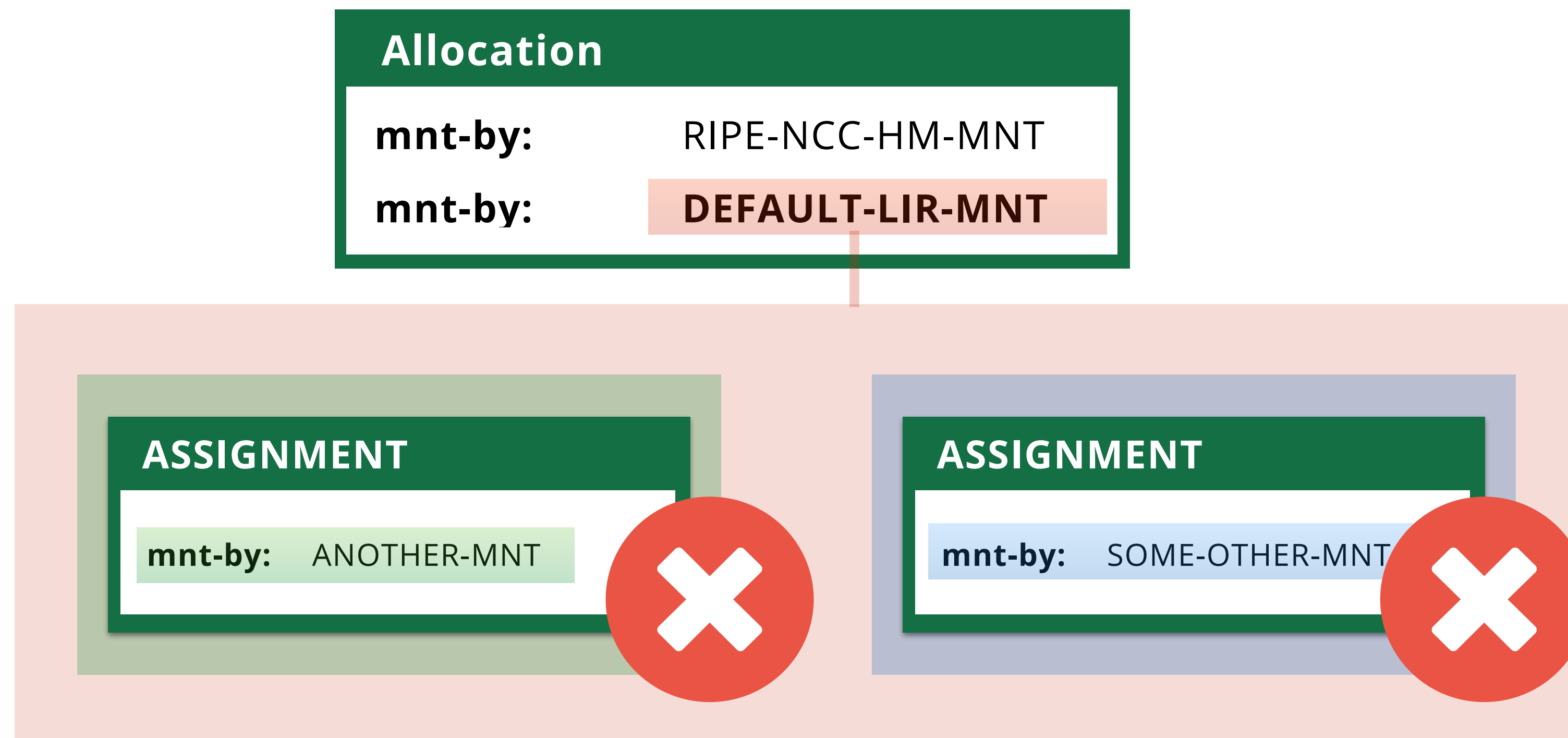
Register an assignment in the sub-allocation.





LIR Keeps Control

- LIR Default Maintainer has control over the whole address space
- Use “**Force Delete**” to remove lost objects



Take the poll!

Which **status** do you use for an IPv6 sub-allocation?





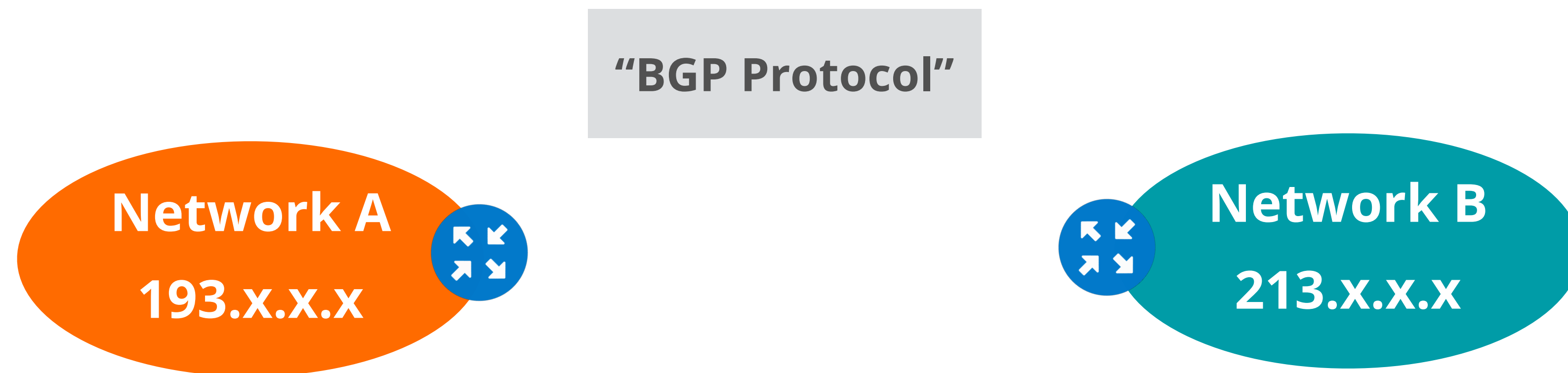
Routing Registry

Making routing safer

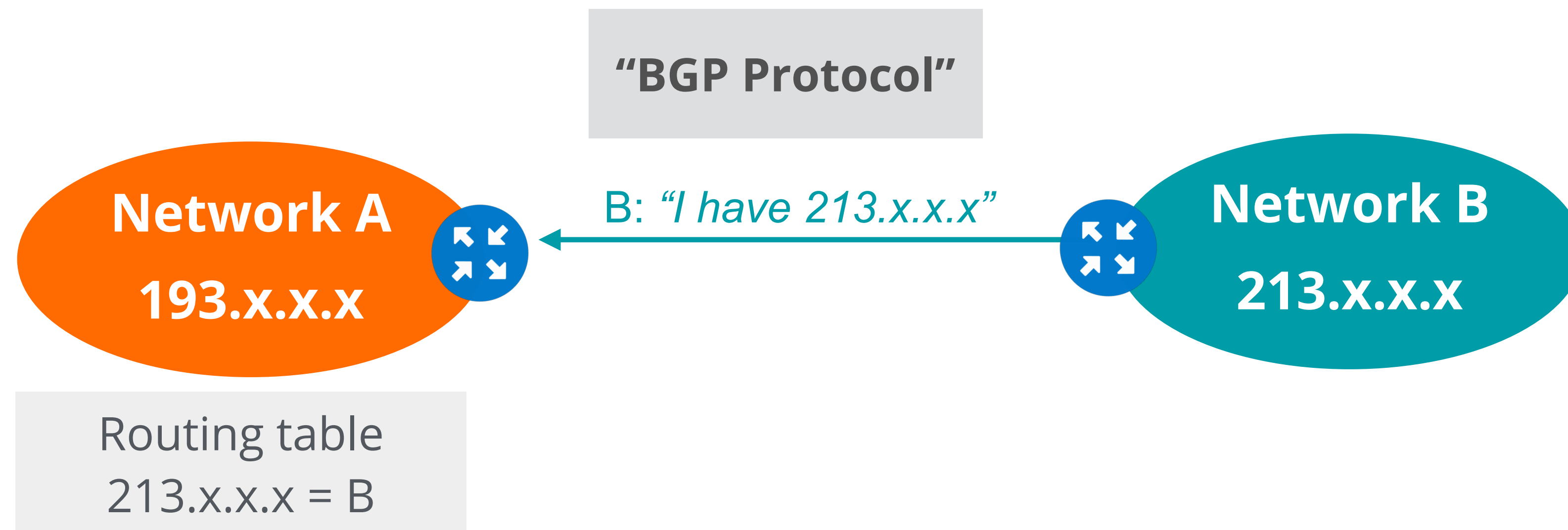
Routing on the Internet



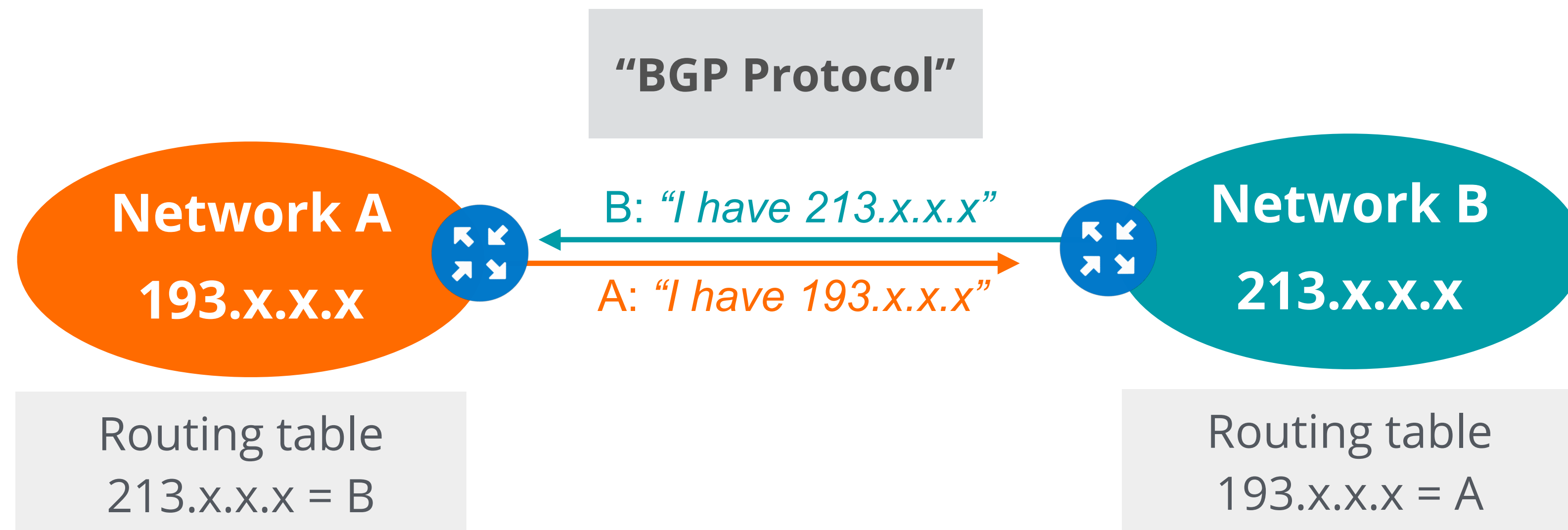
Routing on the Internet



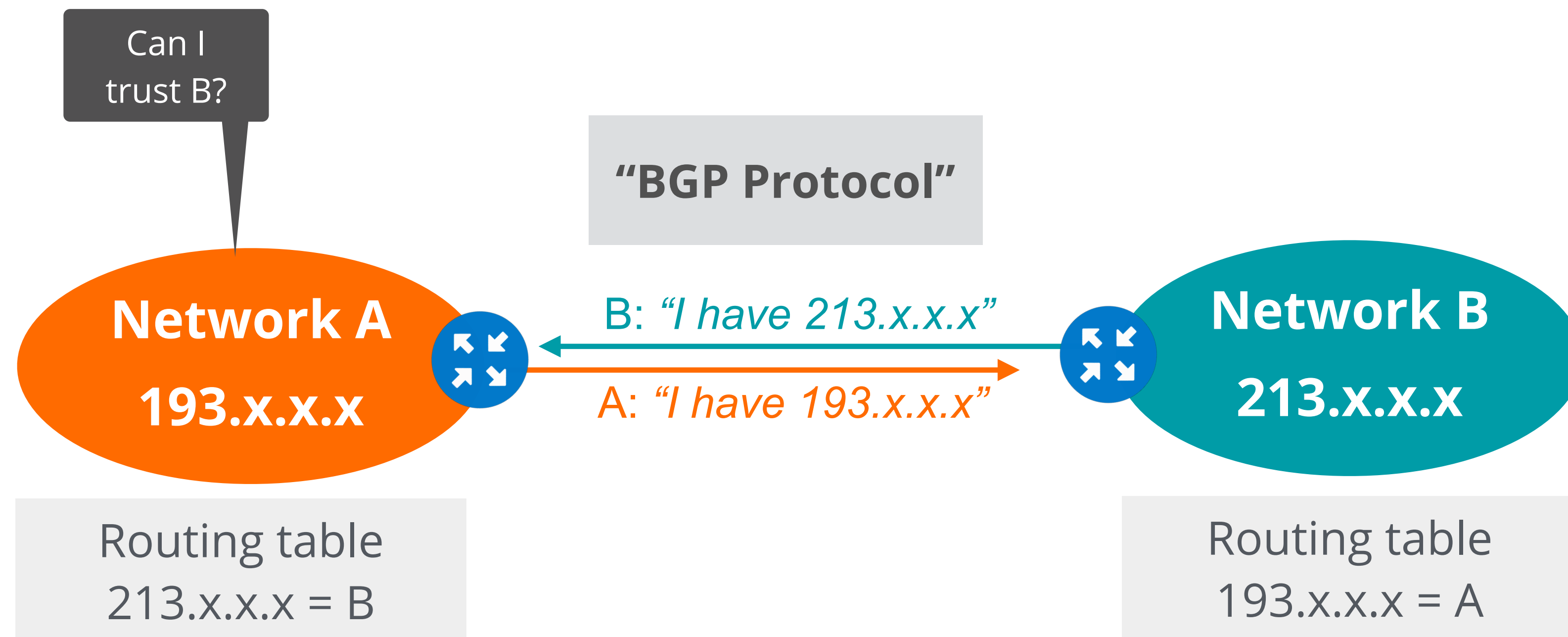
Routing on the Internet



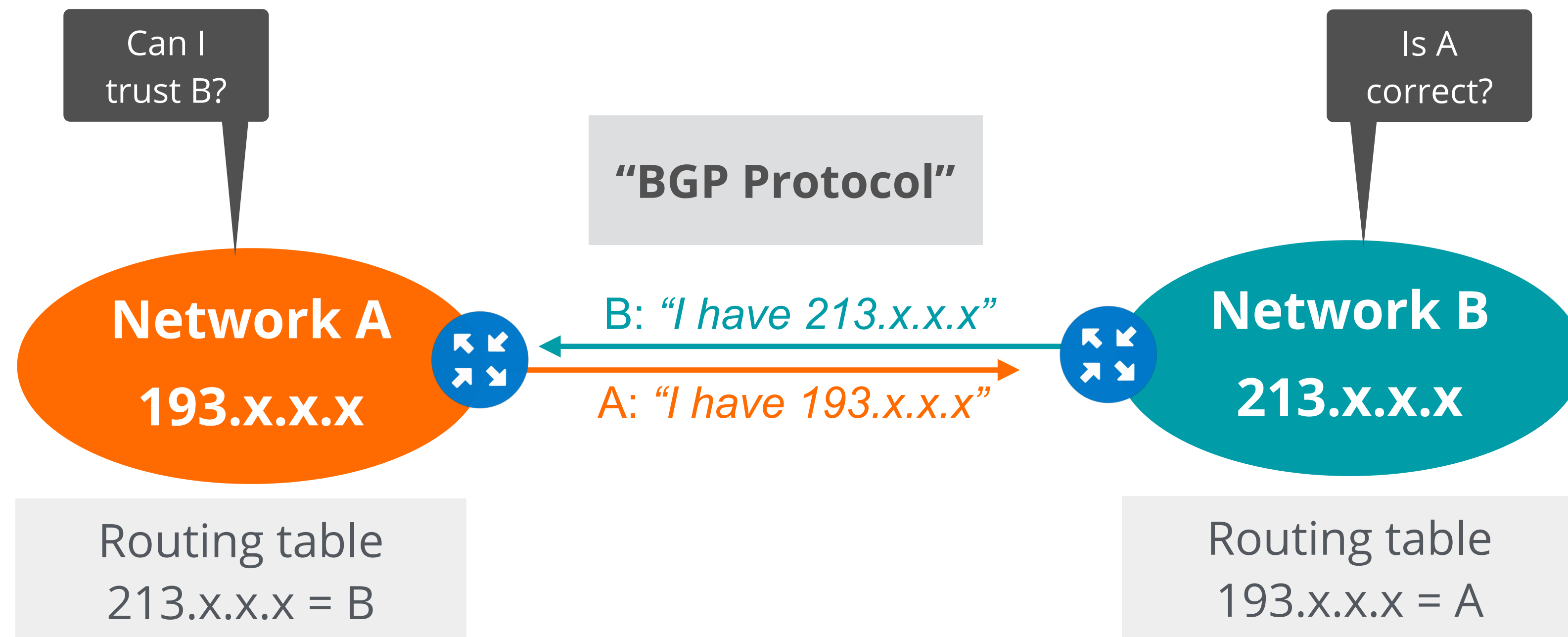
Routing on the Internet



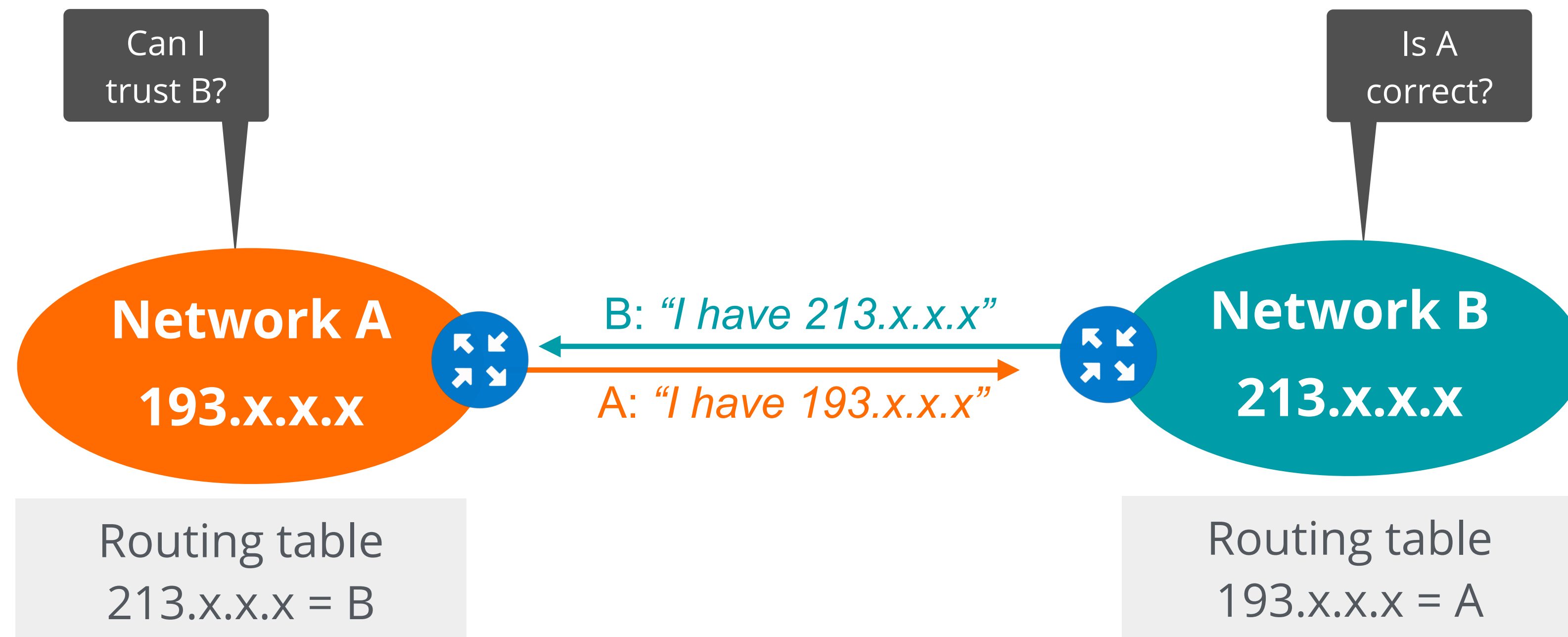
Routing on the Internet



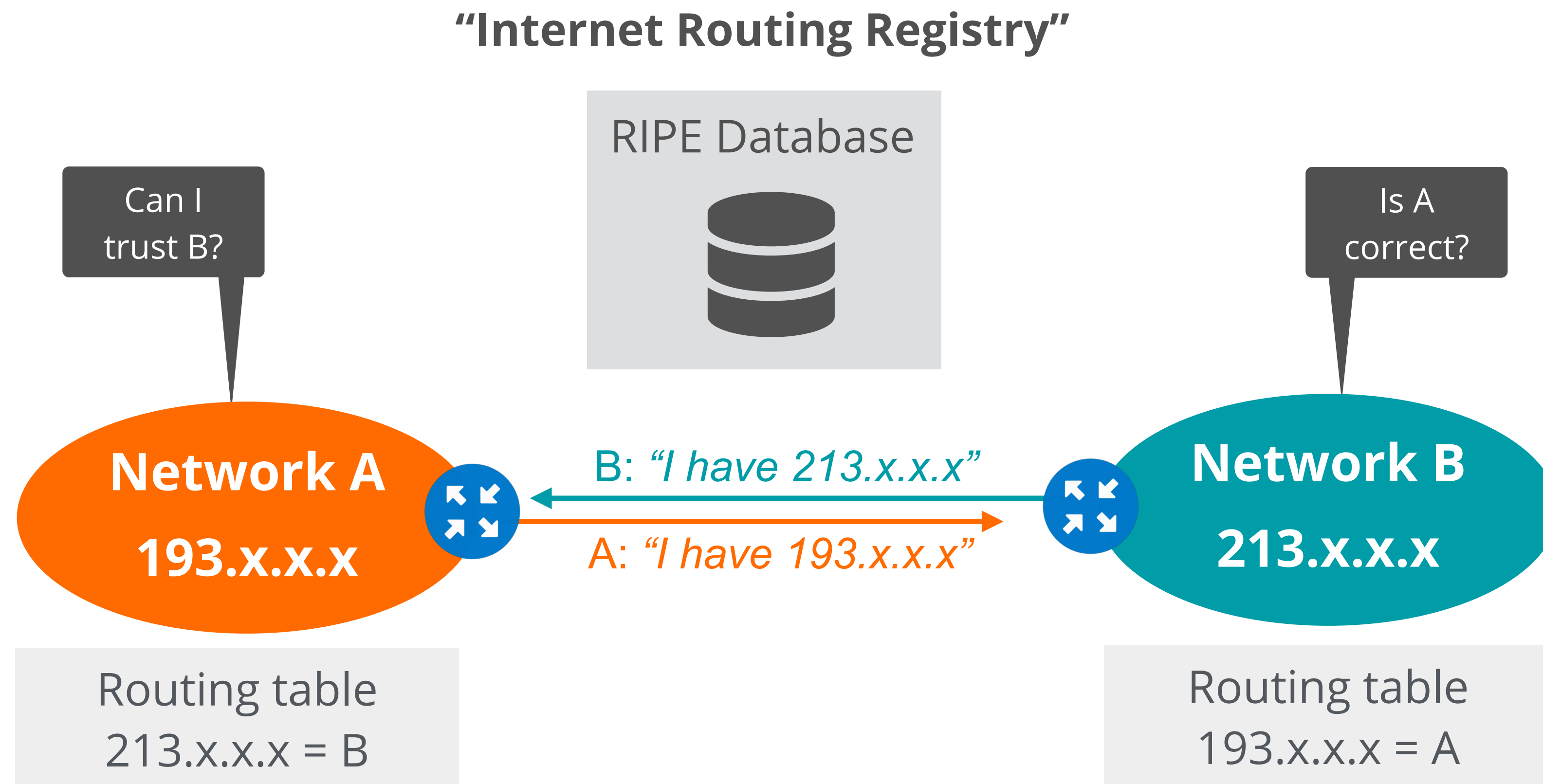
Routing on the Internet



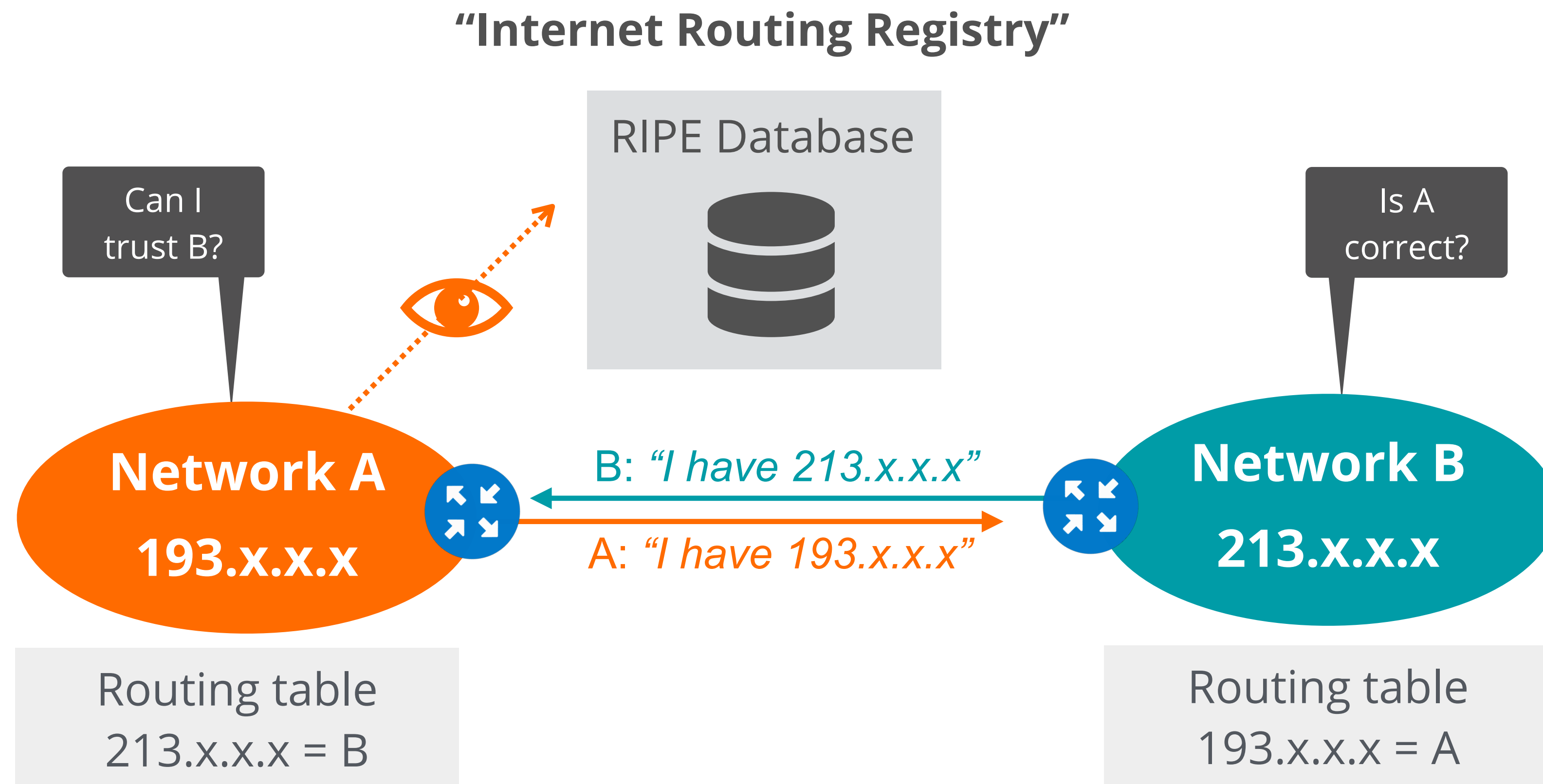
Routing on the Internet



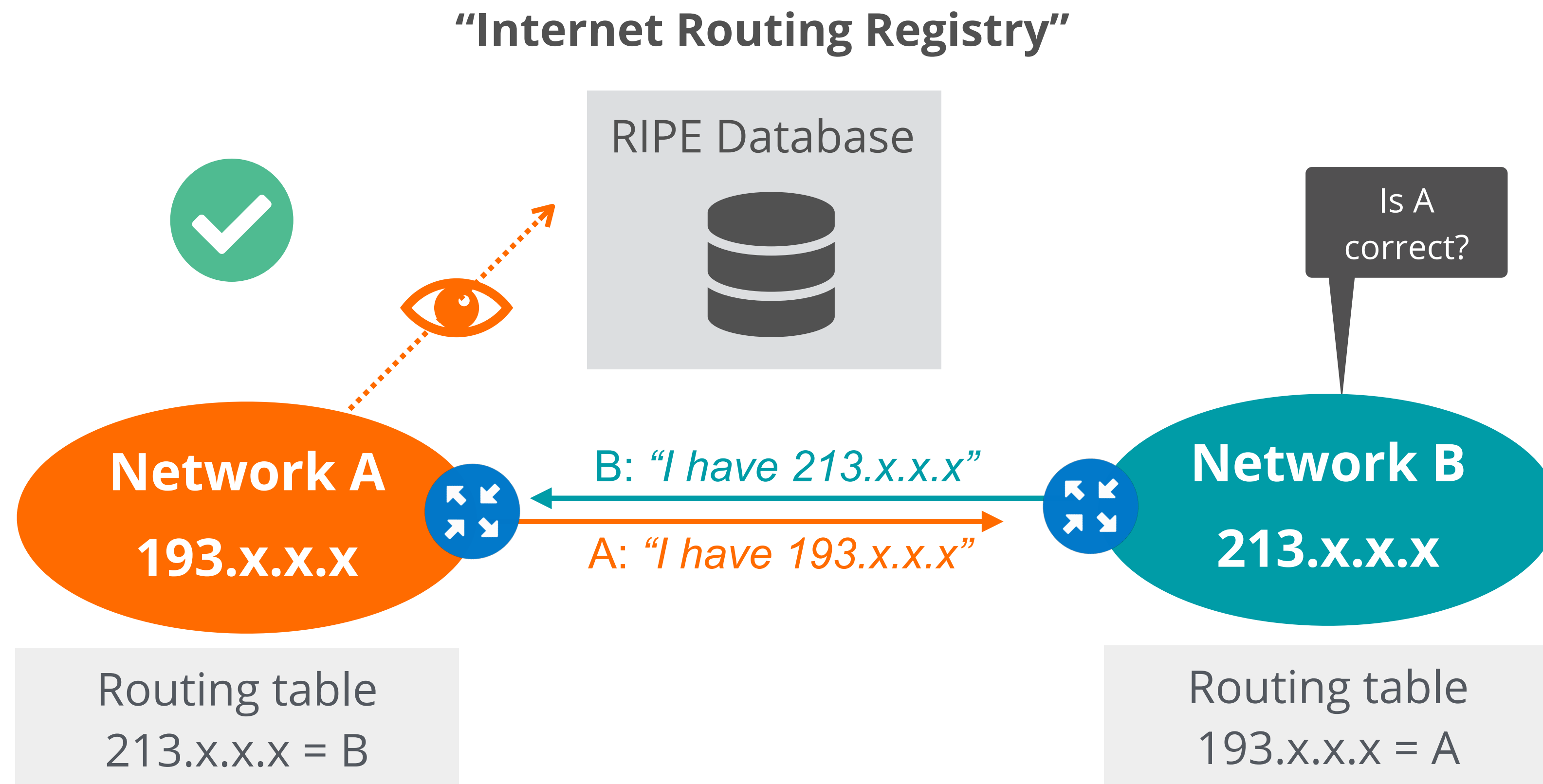
How to Secure Routing?



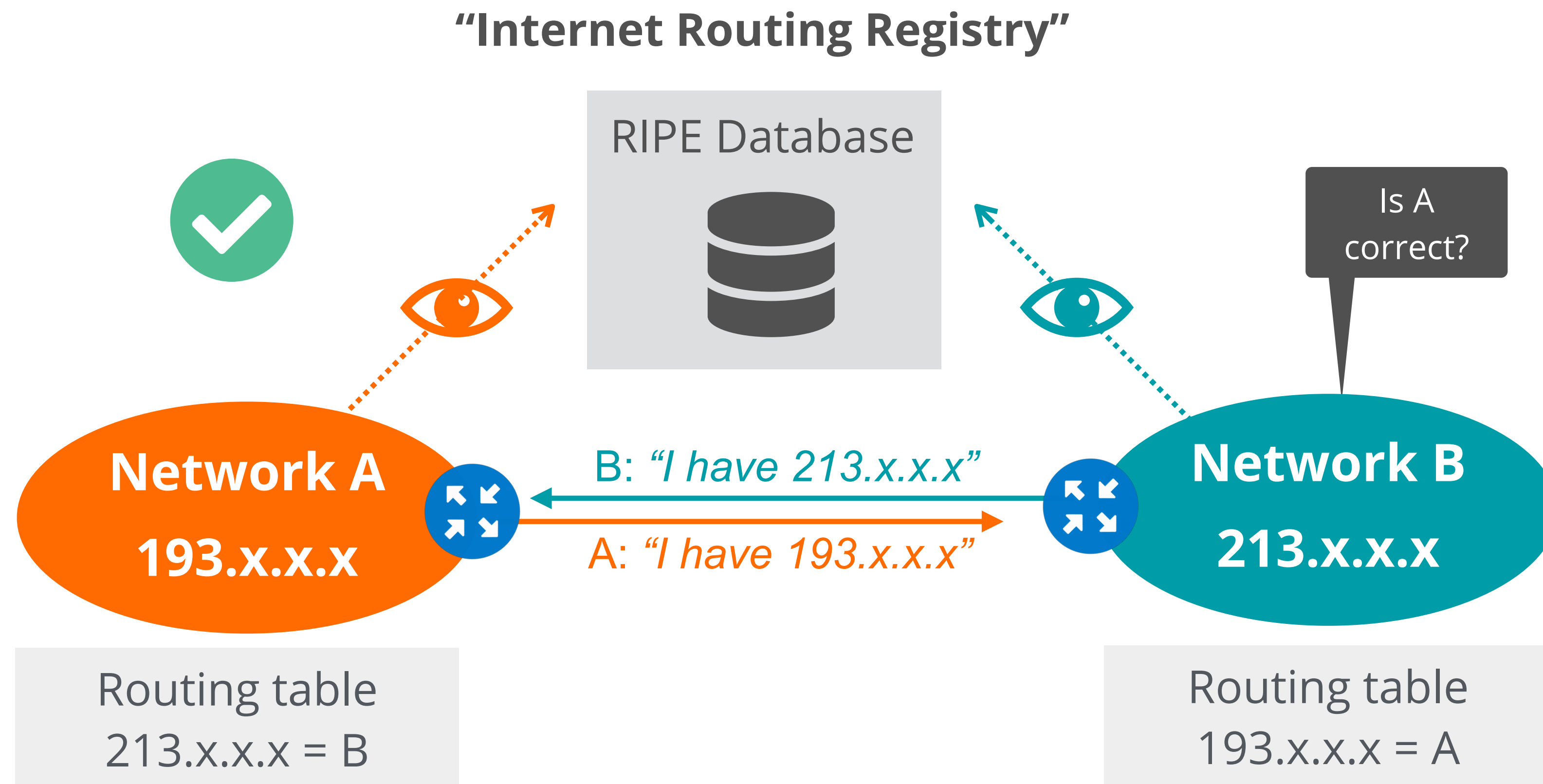
How to Secure Routing?



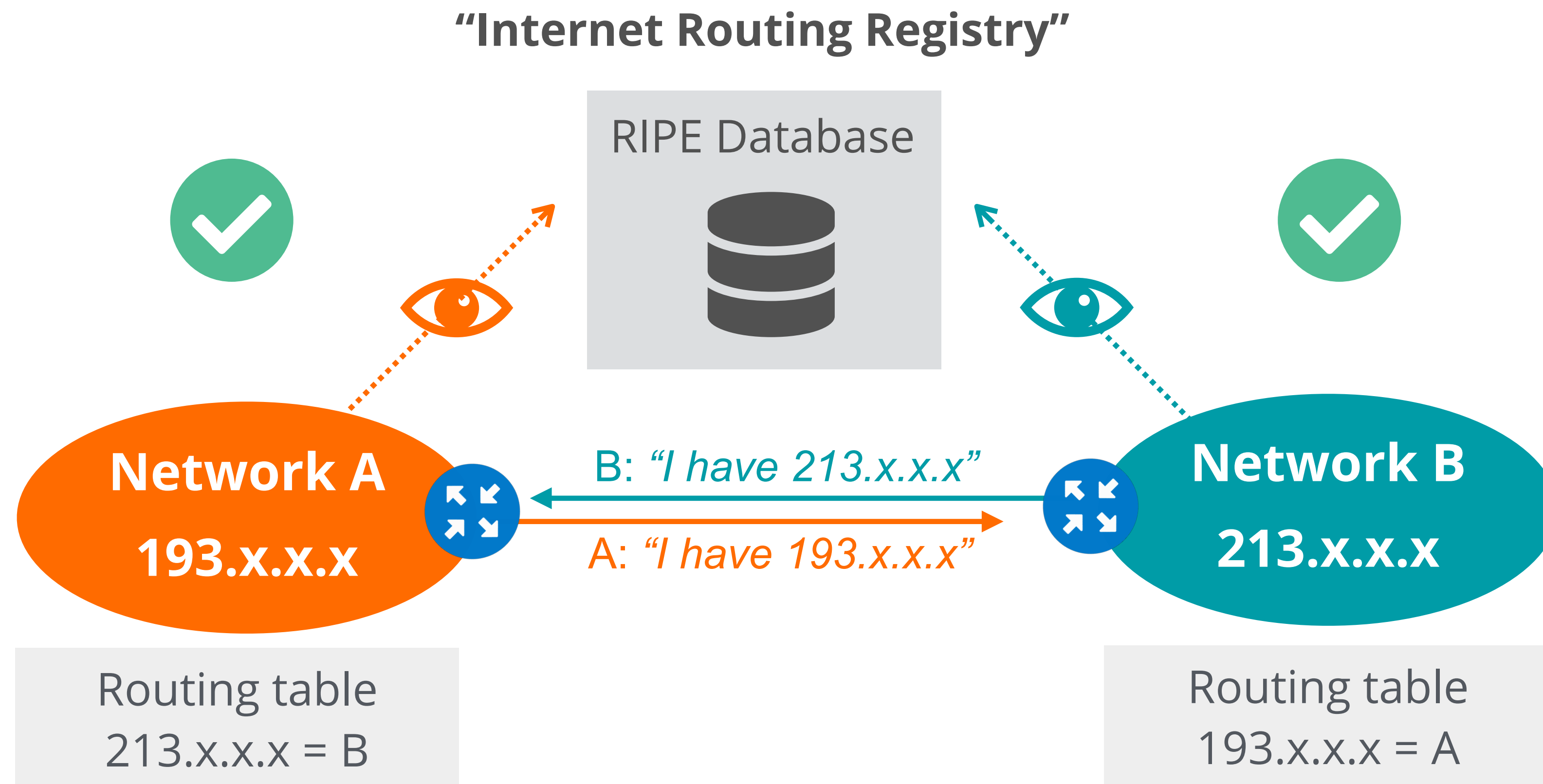
How to Secure Routing?



How to Secure Routing?



How to Secure Routing?

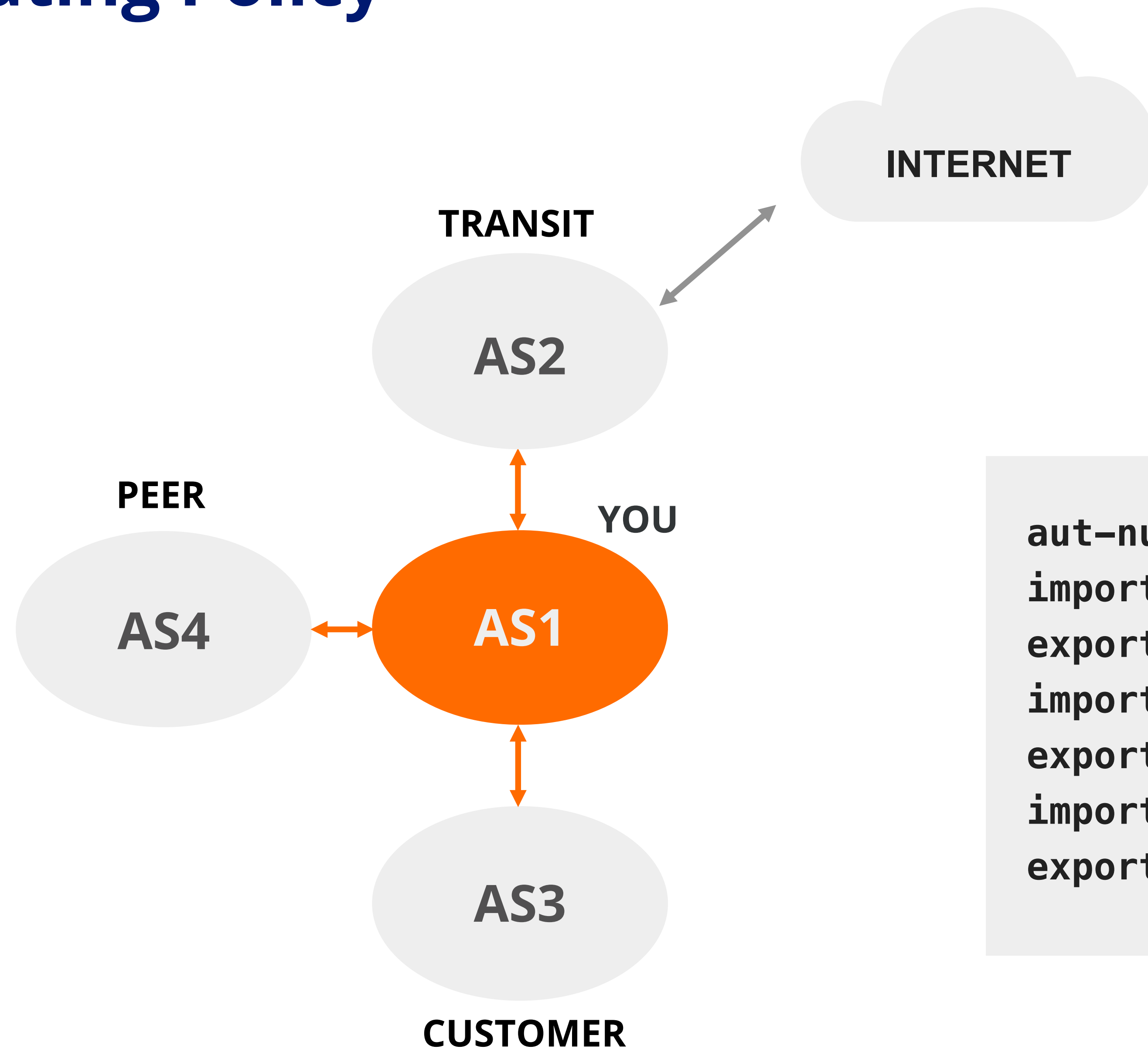


Autonomous Number Objects

- Known as **aut-num** objects
- Register **who** holds an AS Number
- Shows the routing policy for that AS

aut-num:	AS12345
as-name:	YOUR-AS-NAME
org:	ORG-EE2-RIPE
import:	from AS1010 accept ANY
export:	to AS1010 announce AS12345
import:	from AS987 accept ANY
export:	to AS987 announce AS12345
admin-c:	DV789-RIPE
tech-c:	JS123-RIPE
status:	ASSIGNED
mnt-by:	RIPE-NCC-END-MNT
mnt-by:	DEFAULT-LIR-MNT
source:	RIPE

Routing Policy

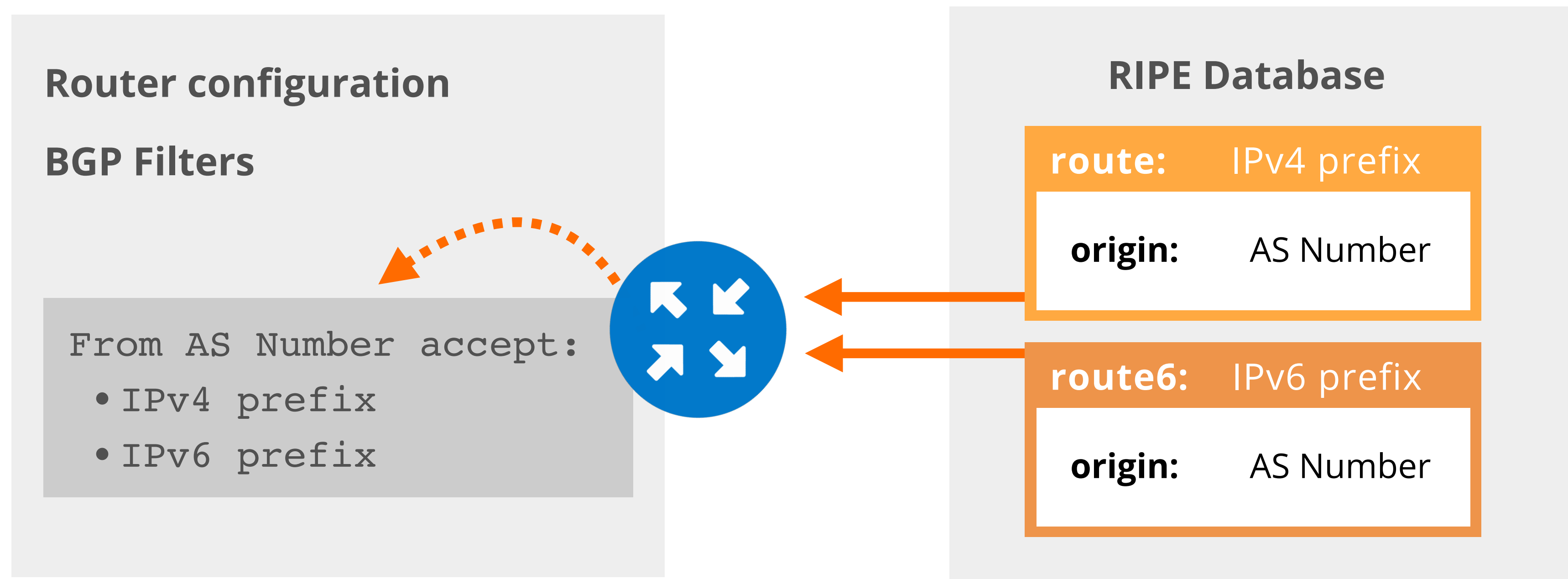


```
aut-num: AS1
import: from AS2 accept ANY
export: to AS2 announce AS1 AS3
import: from AS3 accept AS3
export: to AS3 announce ANY
import: from AS4 accept AS4
export: to AS4 announce AS1 AS3
```



What Are route(6) Objects?

- **route(6)** objects register which IPv4/IPv6 prefix will be announced by which AS number
- Used for creating BGP filters





Primary key of route(6) objects

route: 192.168.0.0/21

origin: AS65530

→ 192.168.0.0/21AS65530

route6: 2001:db8::/32

origin: AS65530

→ 2001:db8::/32AS65530



How To Create route(6) Objects

You need permission from:

1. **inetnum** or **inet6num**
2. **route** or **route6**

1

Allocation

mnt-by:	RIPE-NCC-HM-MNT
mnt-by:	DEFAULT-LIR-MNT
mnt-routes:	ANOTHER-MNT

2

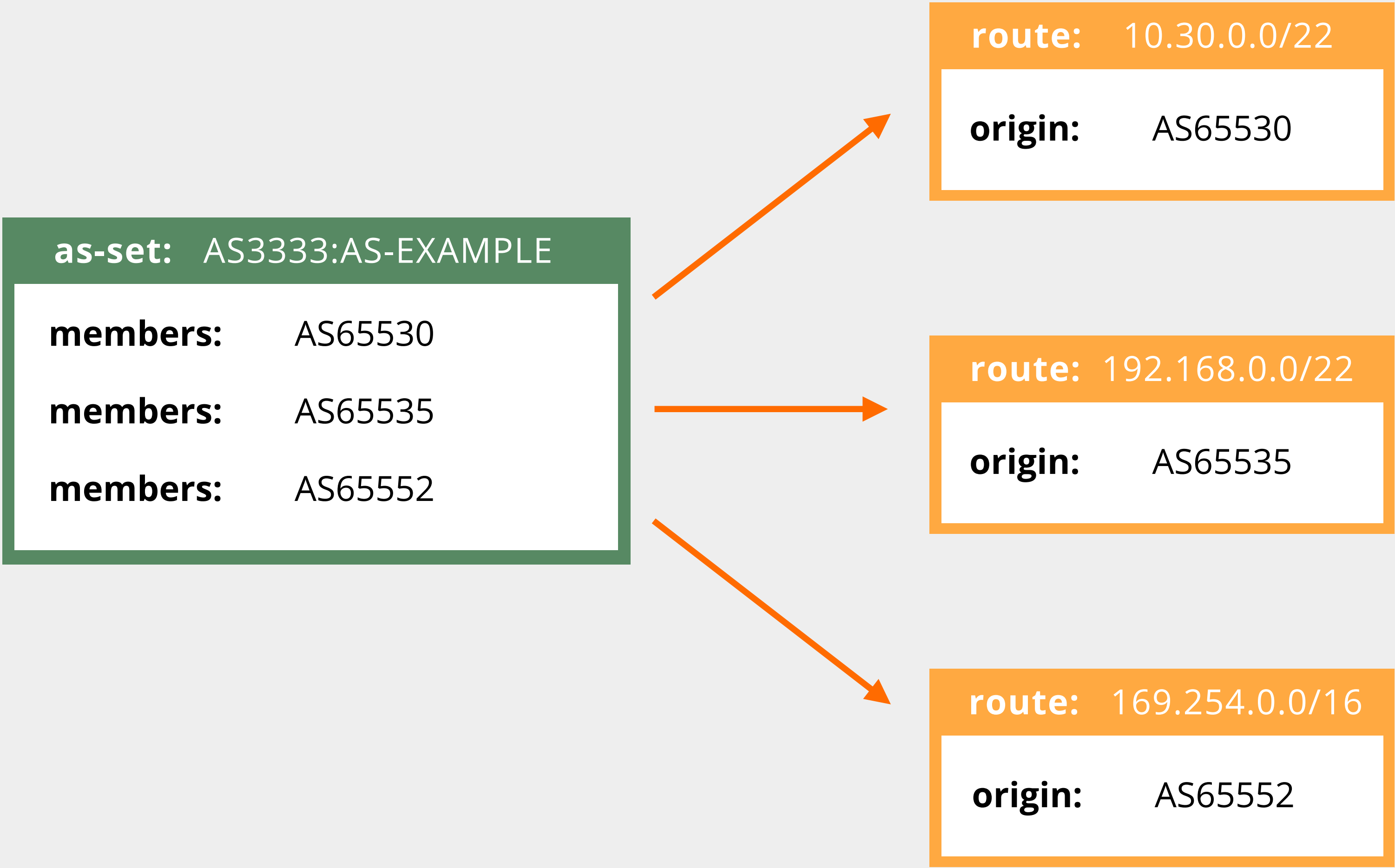
route(6)

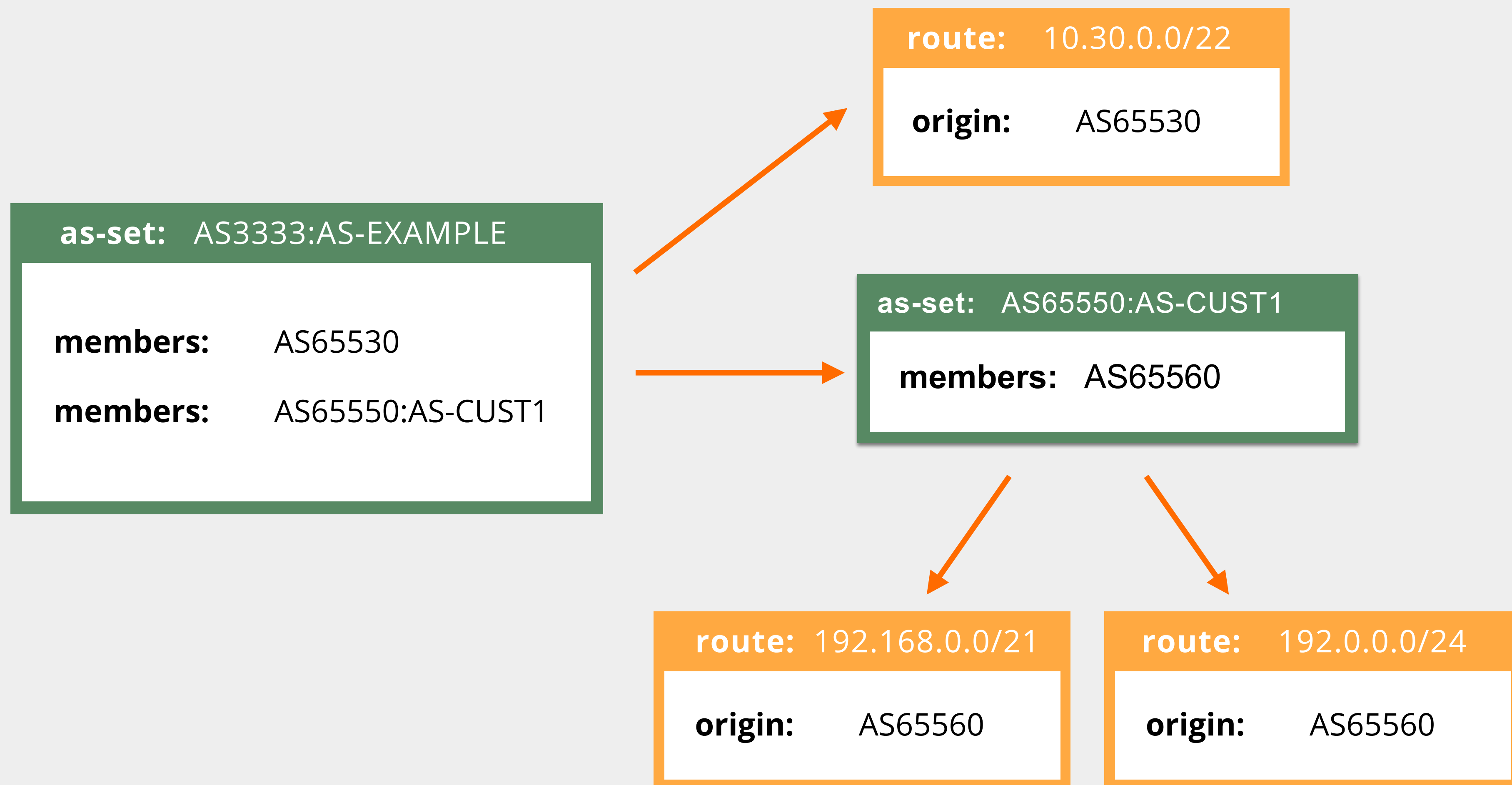
origin:	AS12345
mnt-by:	ANOTHER-MNT

Take the poll!

What would happen if your **route(6)** objects were deleted?







Demo

Create a **route** object.

Create an **as-set** object.





Questions





We will continue in
5 minutes!

Welcome
back!



Take the poll!

Are you enjoying the
RIPE NCC webinar?





Reverse DNS

How to request reverse
delegation



What is Reverse DNS ?

Mapping of IP addresses to host names

193.2.6.139

2001:67c:2e8:22::c100:68b



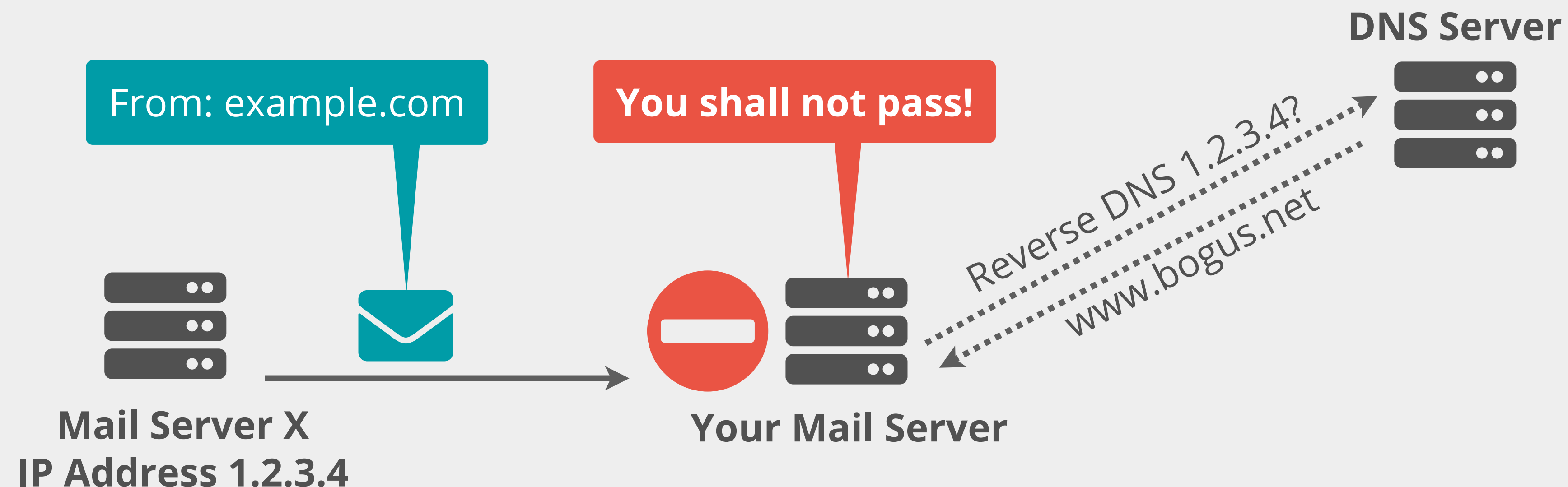
www.ripe.net



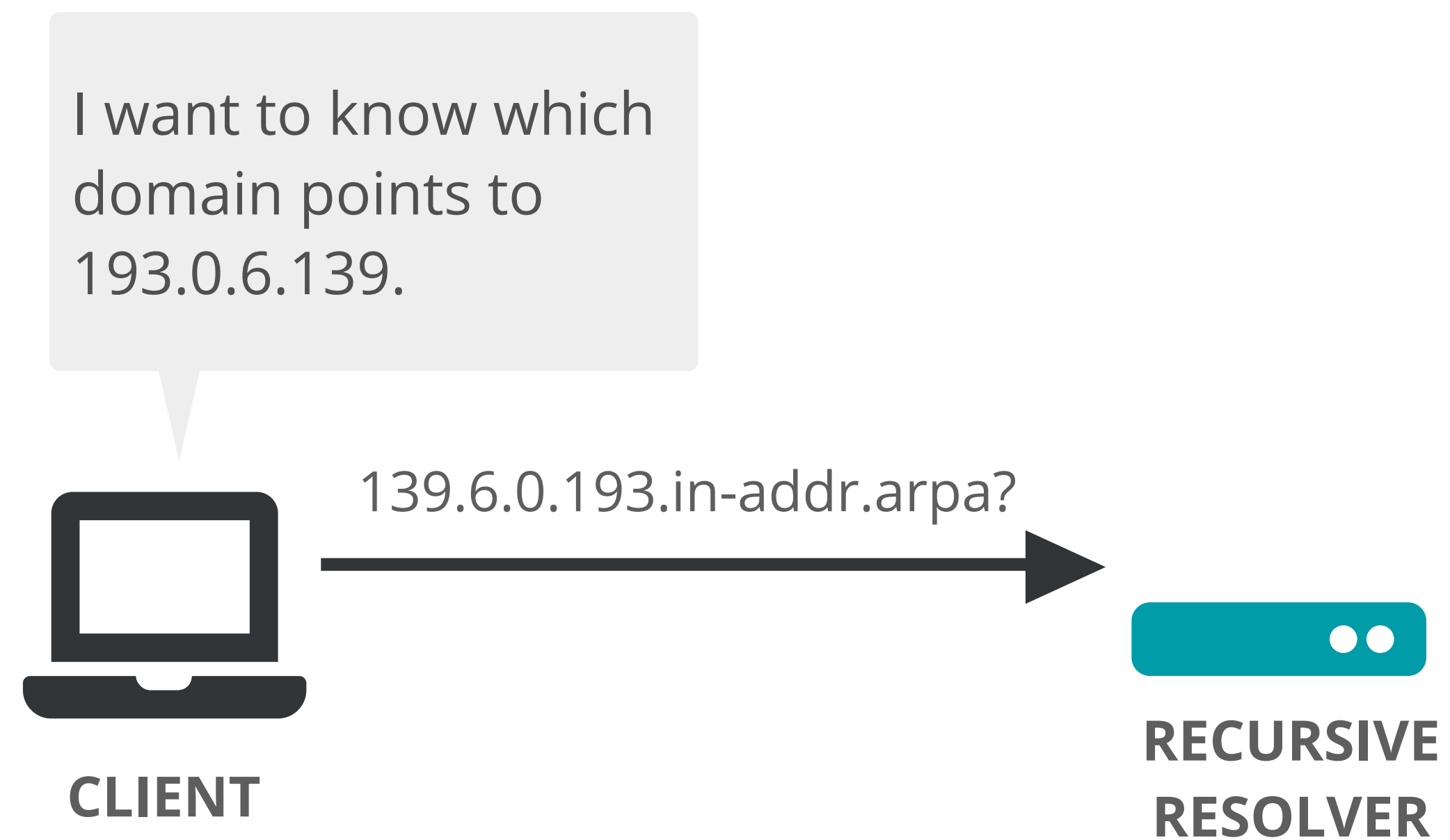
Purpose of Reverse DNS

Reverse DNS is used for:

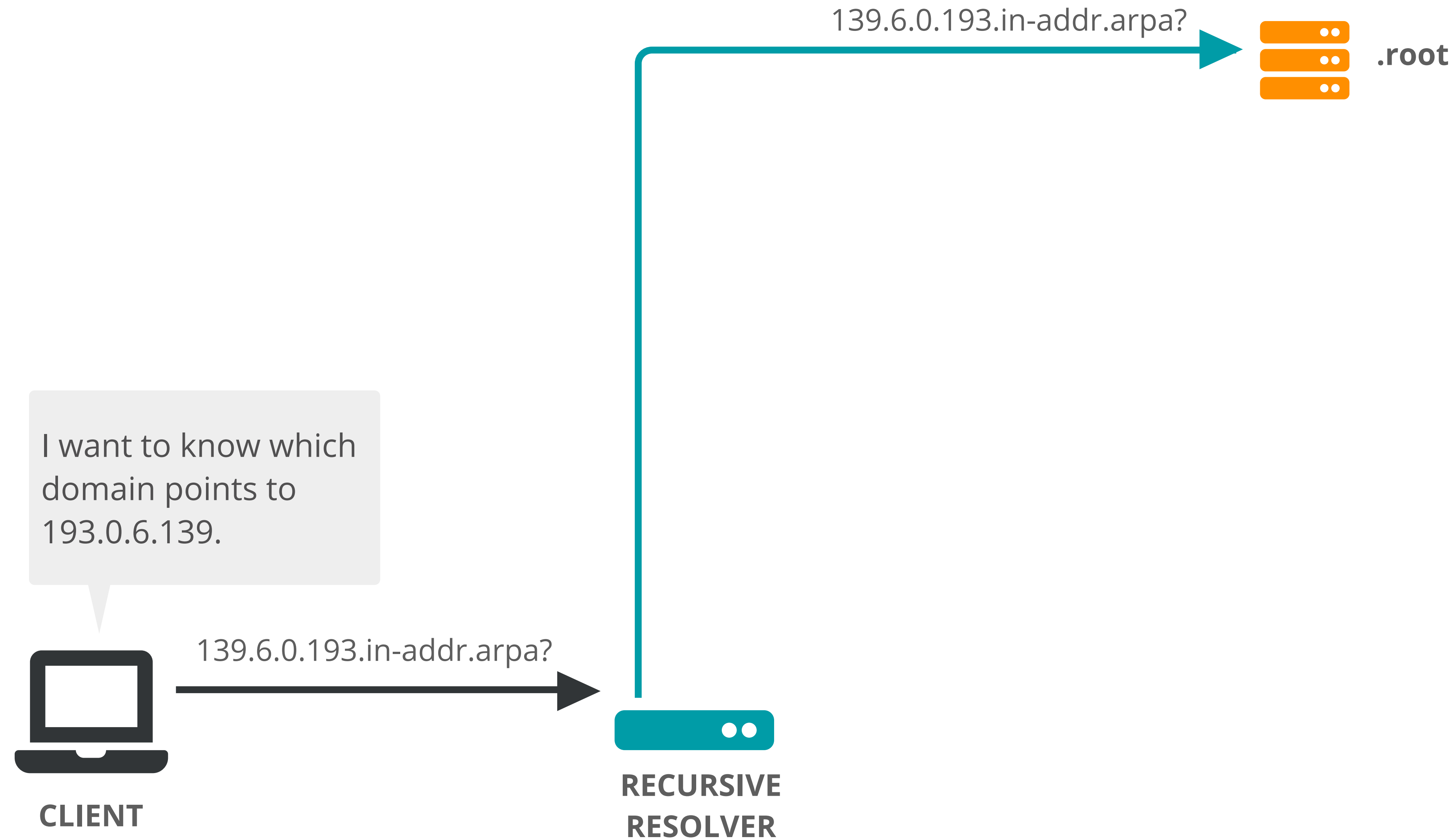
- Identifying Spam
- Network Diagnostics
- Controlling Access to a Network



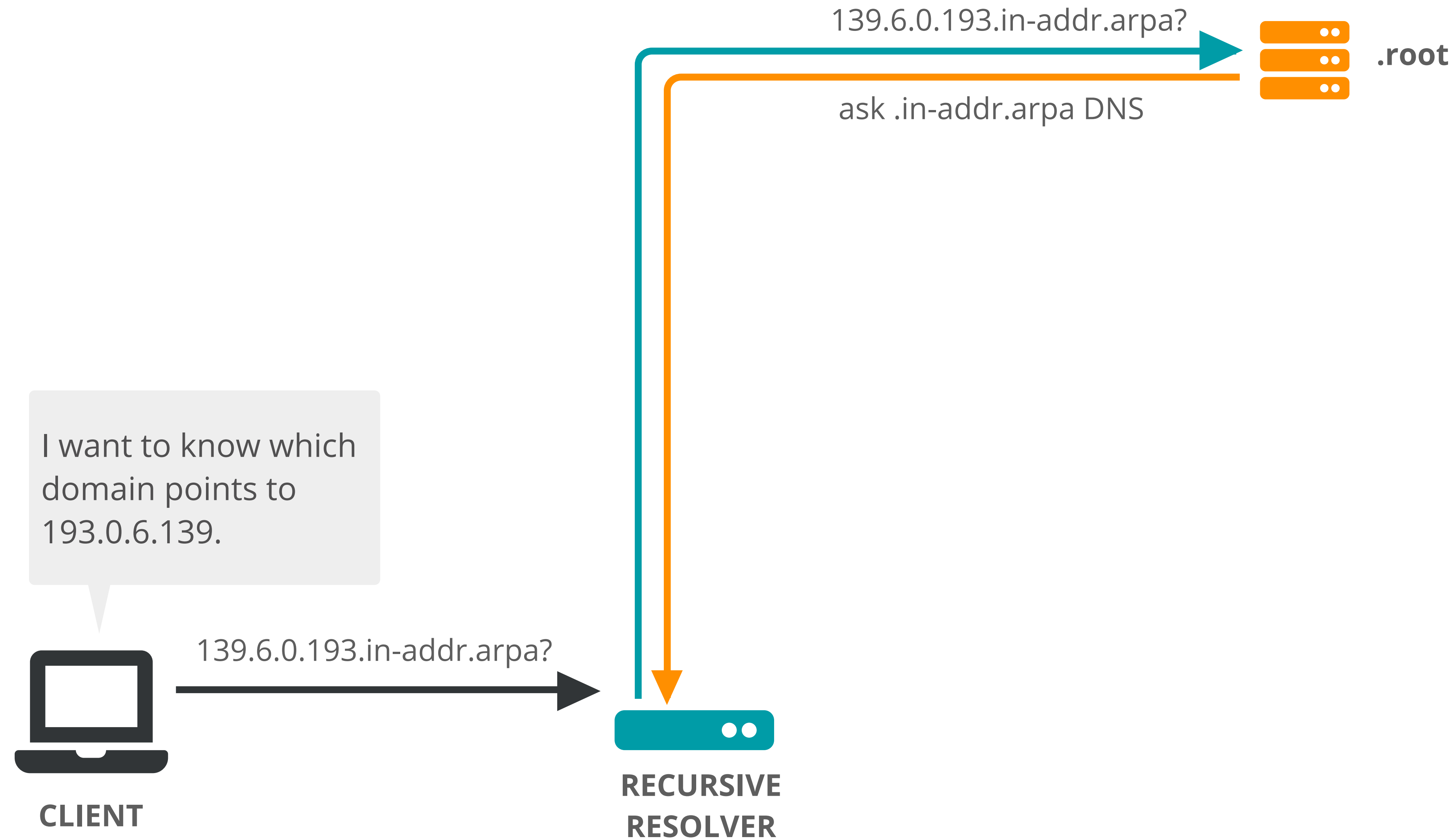
How does Reverse DNS Work?



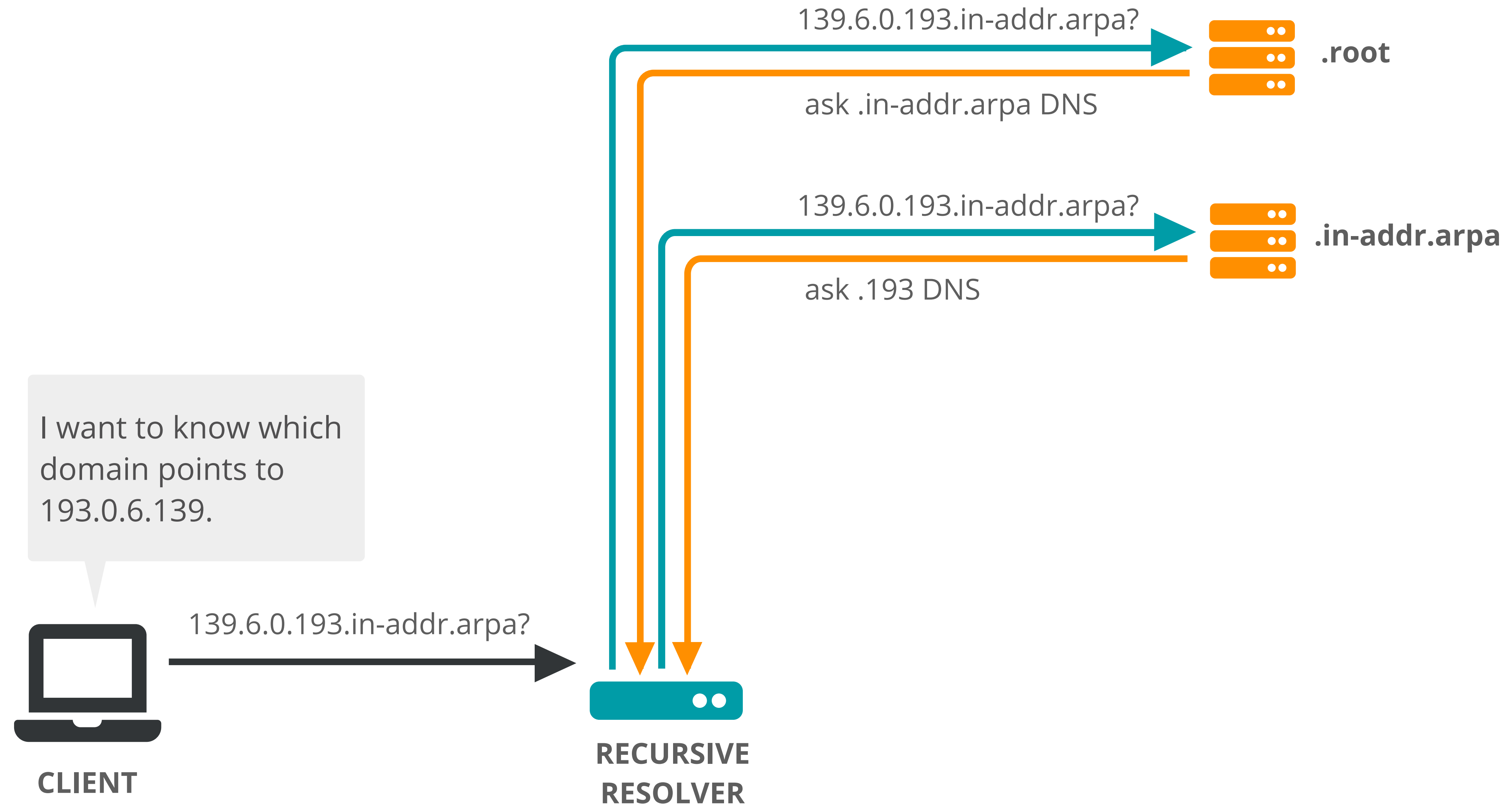
How does Reverse DNS Work?



How does Reverse DNS Work?

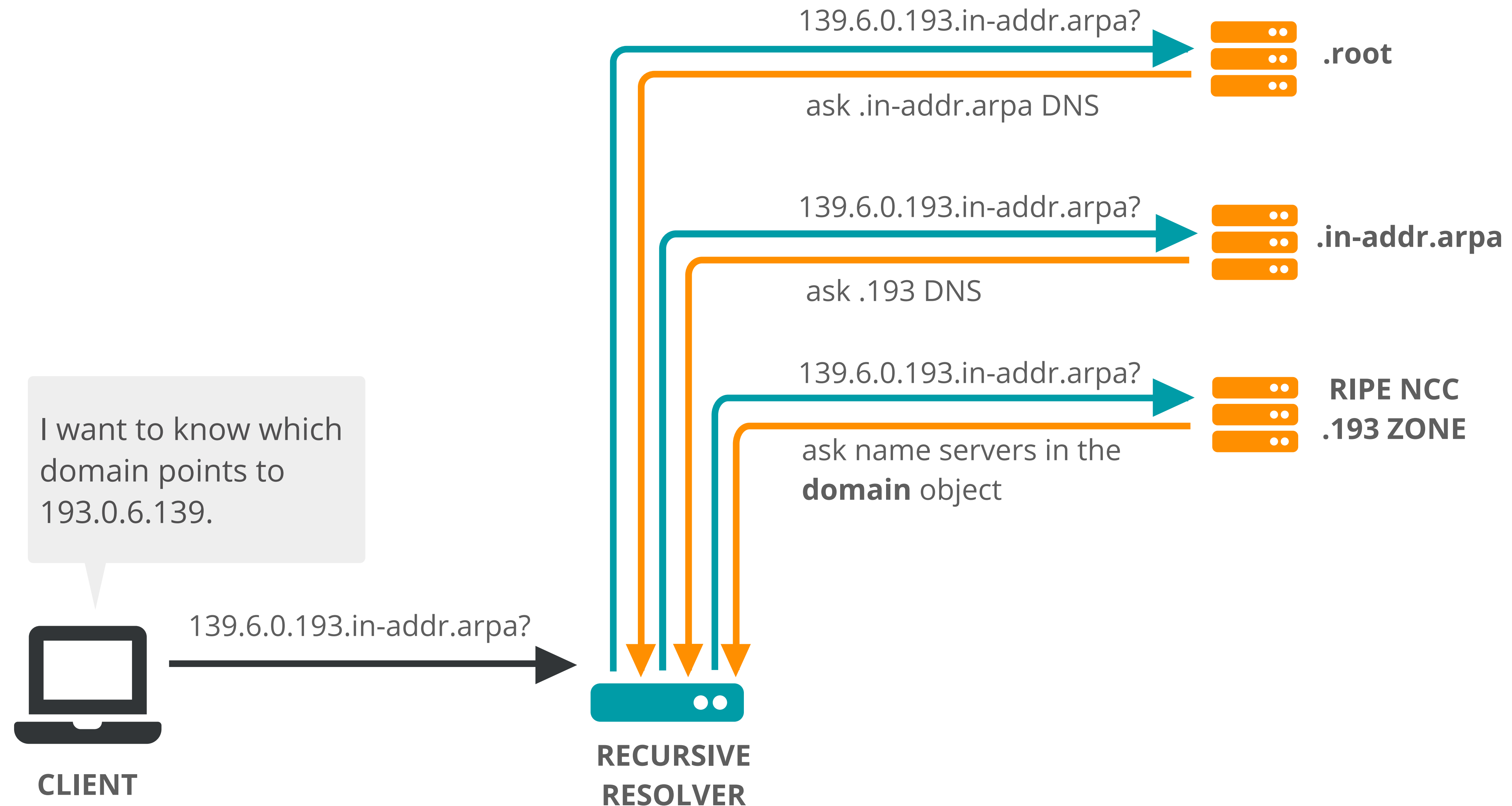


How does Reverse DNS Work?

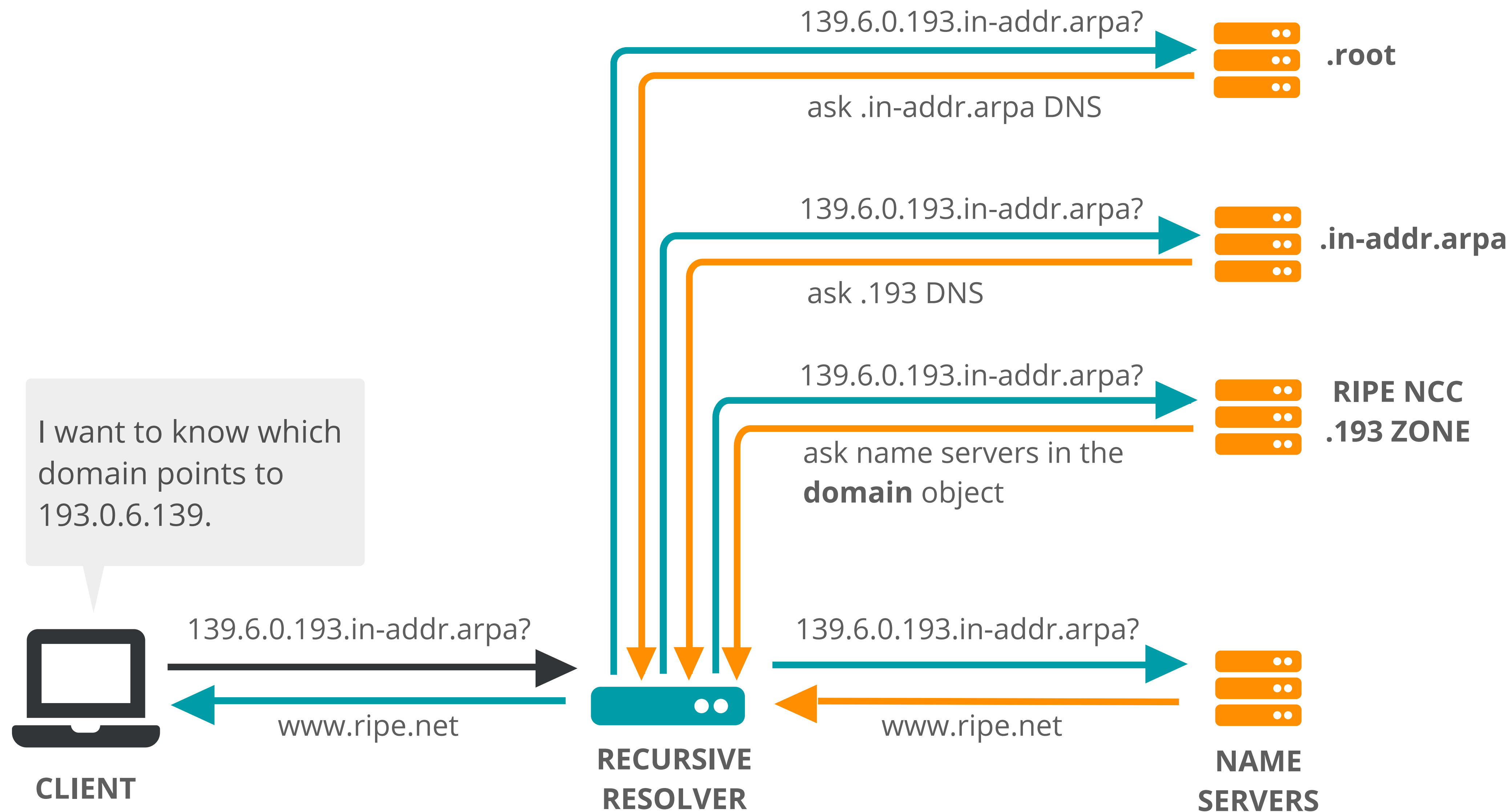




How does Reverse DNS Work?

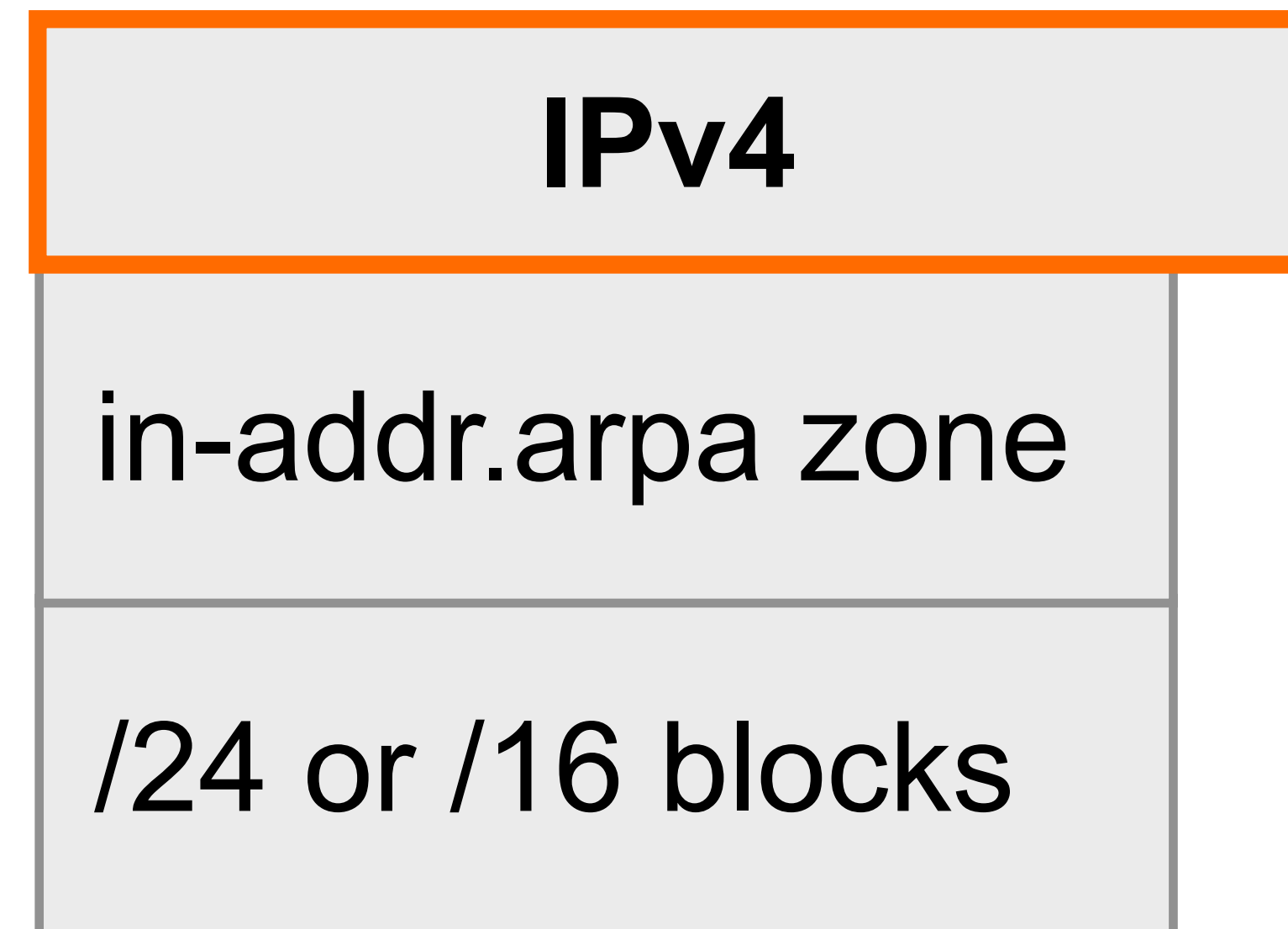


How does Reverse DNS Work?

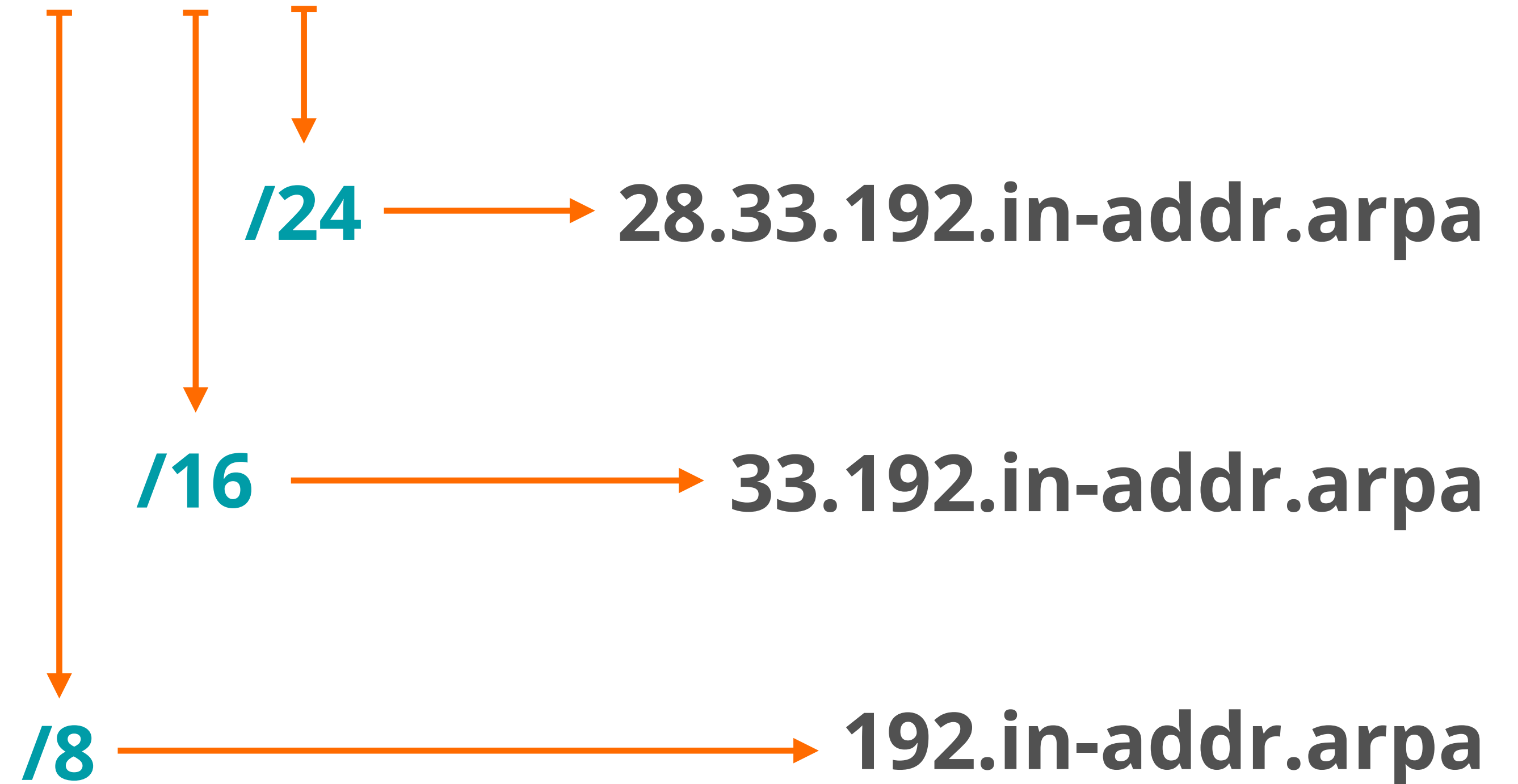




Reverse Delegation Basics



192.33.28.0



Take the poll!

How many domain objects
need to be created for
192.168.8.0/21?



Reverse Delegation Basics



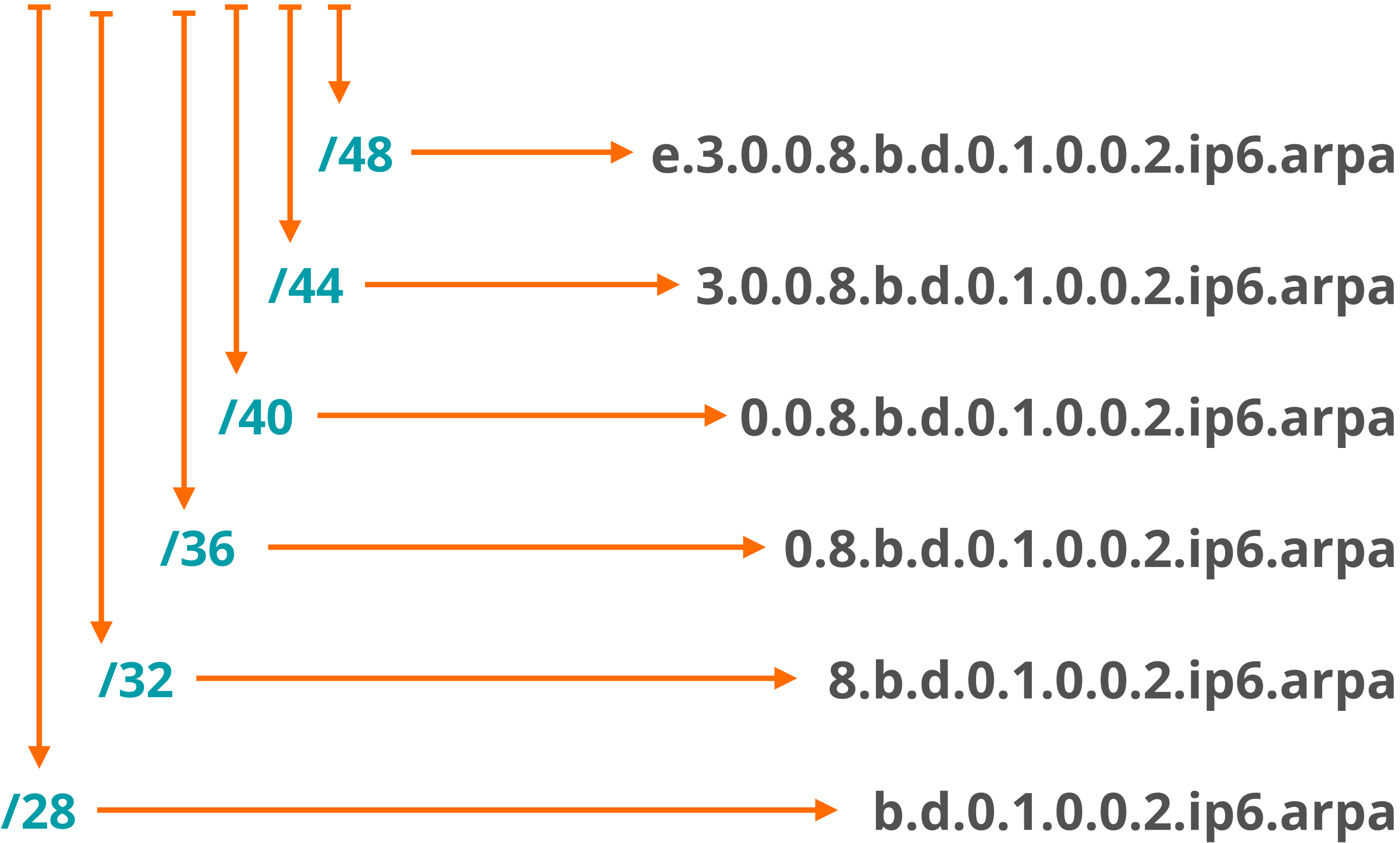
IPv6

ip6.arpa zone

Multiple of 4 bits

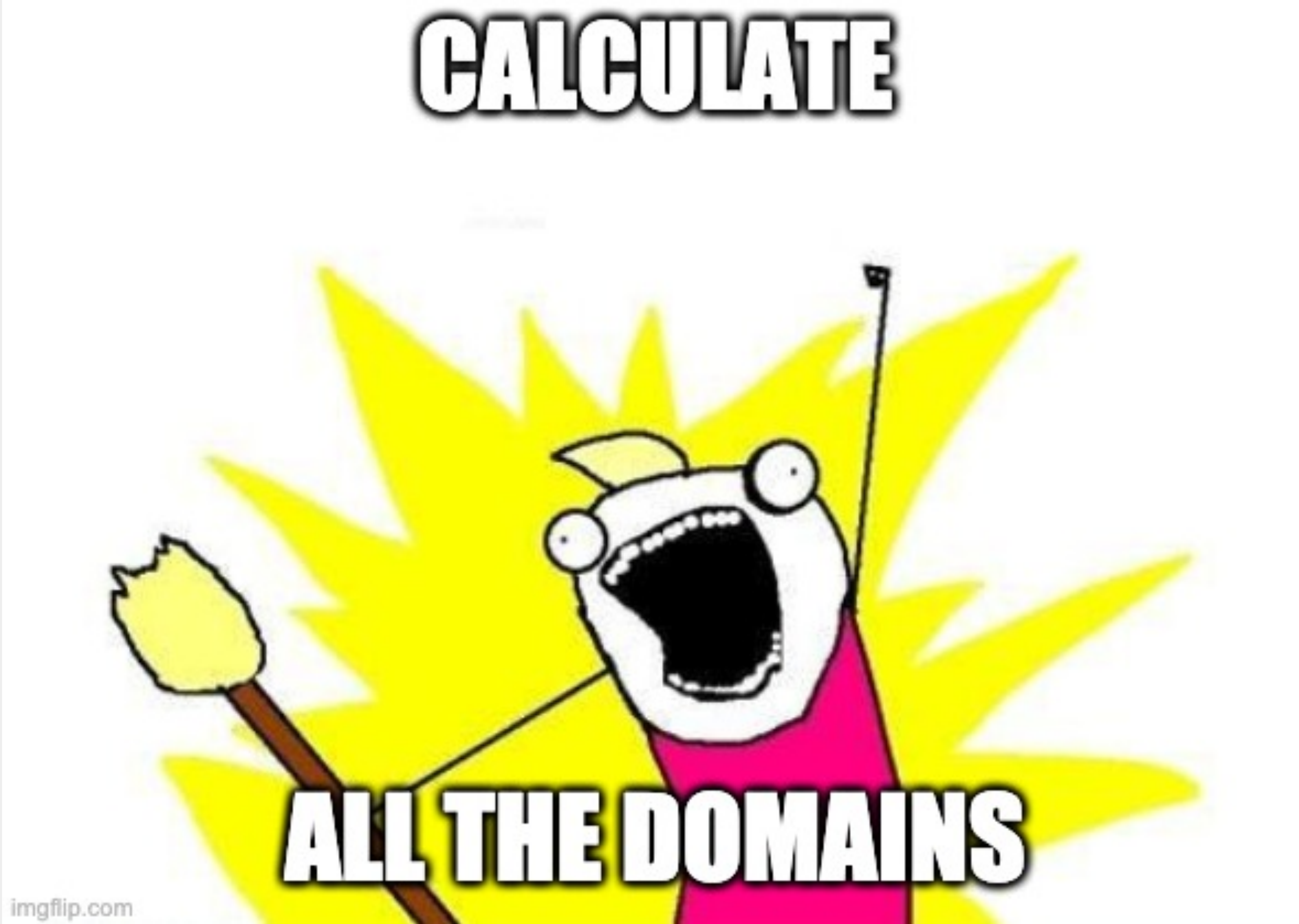
/28, /32, /36, /40,
/44, /48, /52, /56...

2001:0db8:003e:ef11:0000:0000:c100:004d



Take the poll!

How many domain objects
need to be created for
2001:db8::/29?





Setting up Reverse Delegation

- Configure your DNS servers
 - at least two name servers in different subnets
 - create a zone file on each for each chunk
- Check your zones: <http://dnscheck.ripe.net>

The screenshot shows a web form for checking DNS zones. It has three main sections: 'Domain name' with a text input and a play button; 'Nameservers' with two input fields labeled 'NS' and 'IP', and a plus button; and 'Digests' with a plus button. At the bottom, there is a button labeled 'Fetch data from parent zone' and a checkbox for 'Advanced options'.

Domain name

Nameservers

Digests

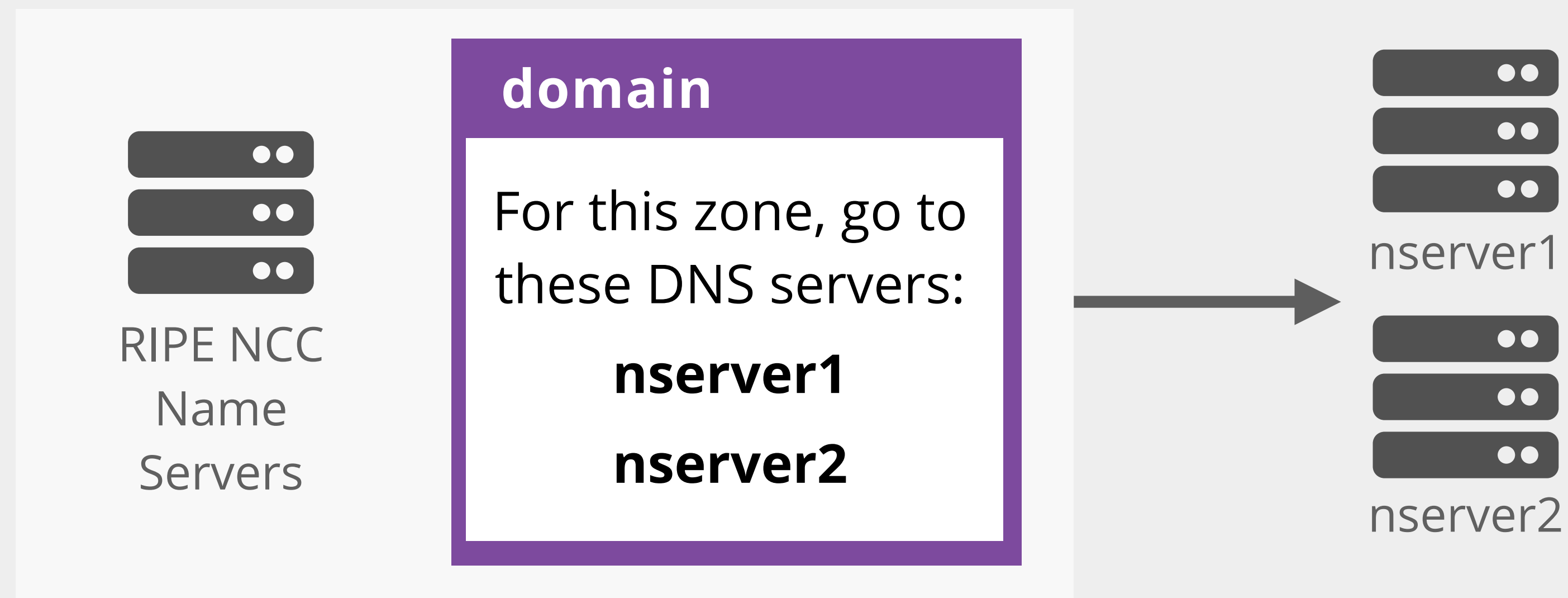
Fetch data from parent zone

☐ Advanced options



domain objects

- Create records on RIPE NCC DNS servers
- They point to name servers that will be authoritative for the zone





IPv4 and domain objects

domain object for prefix: **192.33.28.0/24**

domain:	28.33.192.in-addr.arpa
descr:	rDNS for my IPv4 network
admin-c:	NOC12-RIPE
tech-c:	NOC12-RIPE
zone-c:	NOC12-RIPE
nserver:	pri.example.net
nserver:	sns.company.org
ds-rdata:	45062 8 2 275d9acbf3d3fec11b6d6...
mnt-by:	EXAMPLE-LIR—MNT
created:	2015-01-21T13:52:29Z
last-modified:	2016-02-07T15:09:46Z
source:	RIPE



IPv6 and domain objects

domain object for prefix: **2001:db8::/32**

domain:	8.b.d.0.1.0.0.2.ip6.arpa
descr:	rDNS for my IPv6 network
admin-c:	NOC12-RIPE
tech-c:	NOC12-RIPE
zone-c:	NOC12-RIPE
nserver:	pri.example.net
nserver:	sns.company.org
ds-rdata:	45062 8 2 275d9acbf3d3fec11b6d6...
mnt-by:	EXAMPLE-LIR—MNT
created:	2015-01-21T13:52:29Z
last-modified:	2016-02-07T15:09:46Z
source:	RIPE



Create Domain Objects Wizard

Please enter the maintainers you would like to use as mnt-by

EXAMPLE-MNT x

prefix Prefix looks OK

10.155.16.0/22 ?

nserver Server looks OK

tinnie.arin.net ↓ ?

nserver Server looks OK

sec3.apnic.net ↓ ?

Reverse zones

16.155.10.in-addr.arpa

17.155.10.in-addr.arpa

18.155.10.in-addr.arpa

19.155.10.in-addr.arpa

admin-c

EX9999-RIPE ↓ ?

tech-c

Provide the **maintainer** that will protect the domain objects.



Create Domain Objects Wizard

Please enter the maintainers you would like to use as mnt-by

EXAMPLE-MNT x

prefix Prefix looks OK

10.155.16.0/22 ?

nserver Server looks OK

tinnie.arin.net ↓ ?

nserver Server looks OK

sec3.apnic.net ↓ ?

Reverse zones

16.155.10.in-addr.arpa
17.155.10.in-addr.arpa
18.155.10.in-addr.arpa
19.155.10.in-addr.arpa

admin-c

EX9999-RIPE ↓ ?

tech-c

Order in which the RIPE Database checks for authorisation from the address space:

- mnt-domains:
- mnt-lower:
- mnt-by:



Create Domain Objects Wizard

Please enter the maintainers you would like to use as mnt-by

EXAMPLE-MNT x

prefix Prefix looks OK

10.155.16.0/22 ?

nserver Server looks OK

tinnie.arin.net ↓ ?

nserver Server looks OK

sec3.apnic.net ↓ ?

Reverse zones

16.155.10.in-addr.arpa

17.155.10.in-addr.arpa

18.155.10.in-addr.arpa

19.155.10.in-addr.arpa

admin-c

EX9999-RIPE ↓ ?

tech-c

Provide at least **two** different name servers in **two** different subnets.

They must be **reachable**!

Create Domain Objects Wizard



Please enter the maintainers you would like to use as mnt-by

EXAMPLE-MNT x

prefix Prefix looks OK

10.155.16.0/22 ?

nserver Server looks OK

tinnie.arin.net ↓ ?

nserver Server looks OK

sec3.apnic.net ↓ ?

Reverse zones

16.155.10.in-addr.arpa

17.155.10.in-addr.arpa

18.155.10.in-addr.arpa

19.155.10.in-addr.arpa

admin-c

EX9999-RIPE ↓ ?

tech-c

domain: 16.155.10.in-addr.arpa

mnt-by: EXAMPLE-MNT

domain: 17.155.10.in-addr.arpa

mnt-by: EXAMPLE-MNT

nserver: tinnie.arin.net

domain: 18.155.10.in-addr.arpa

mnt-by: EXAMPLE-MNT

nserver: tinnie.arin.net

domain: 19.155.10.in-addr.arpa

mnt-by: EXAMPLE-MNT

nserver: tinnie.arin.net

nserver: sec3.apnic.net



Questions



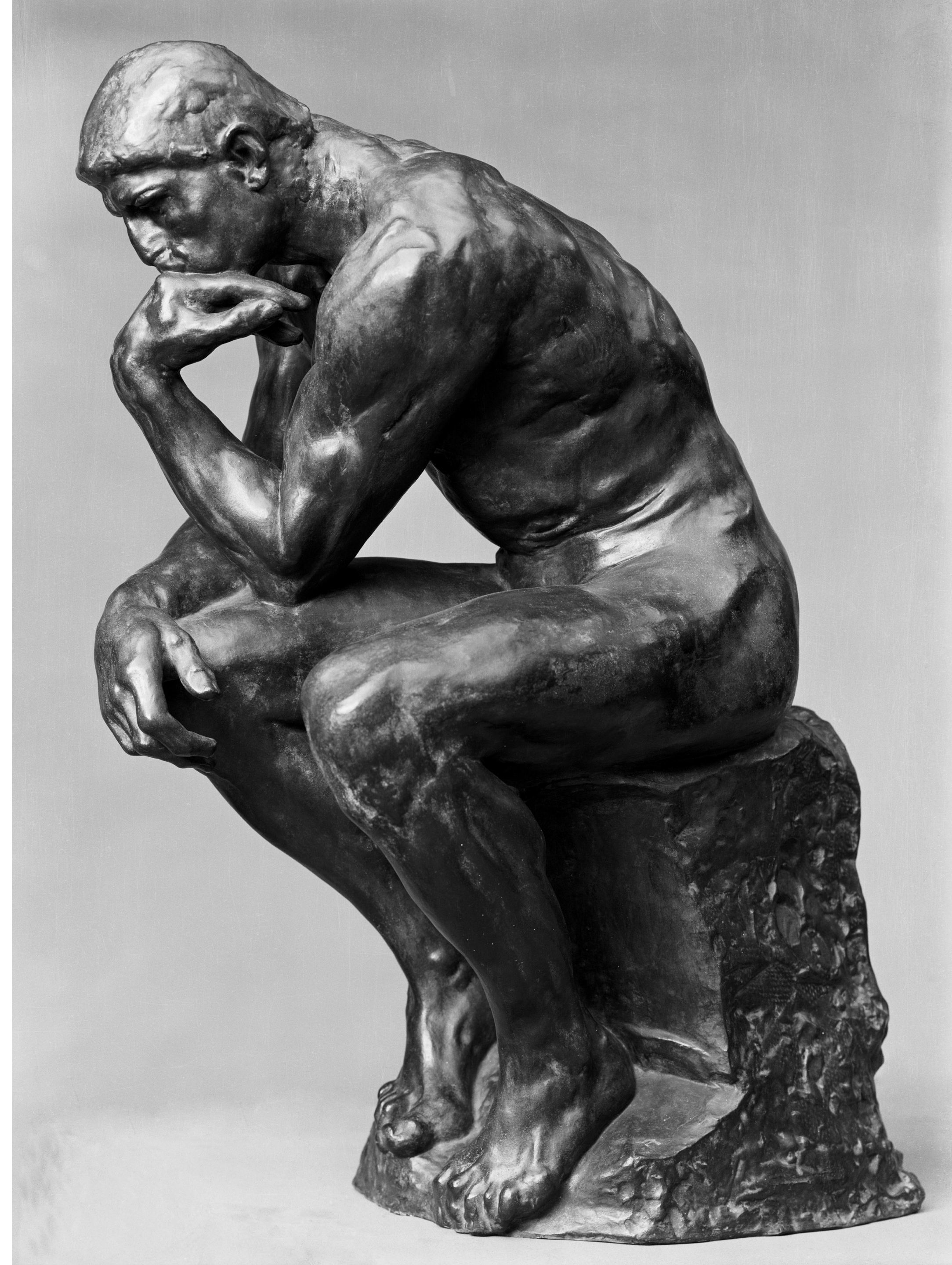


Notifications

How to know if your objects change?

Think about this...

- The RIPE Database is a **public** database
- **Anybody** can search in the database
- **Who** can make updates?
- How can you **know** if somebody updates your objects?





“notify:”

The “**notify:**” attribute is optional

- Can be used on any object
- An email is sent when the object is updated

Person

notify: email@example.com

IP Address Block

notify: noc-team@example.com

LIR Organisation

notify: admin@example.com

“upd-to:”

For **failed** attempts to update objects.

mntner: LIR-MNT

upd-to: db-alerts@example.com



IP Address Block

mnt-by: LIR-MNT



"mnt-nfy:"

For **successful** attempts to update objects.

mntner: LIR-MNT

mnt-nfy: db-success@example.com



IP Address Block

mnt-by: LIR-MNT



Take the poll!

What would happen if your objects were updated and you had **not** set up notifications?





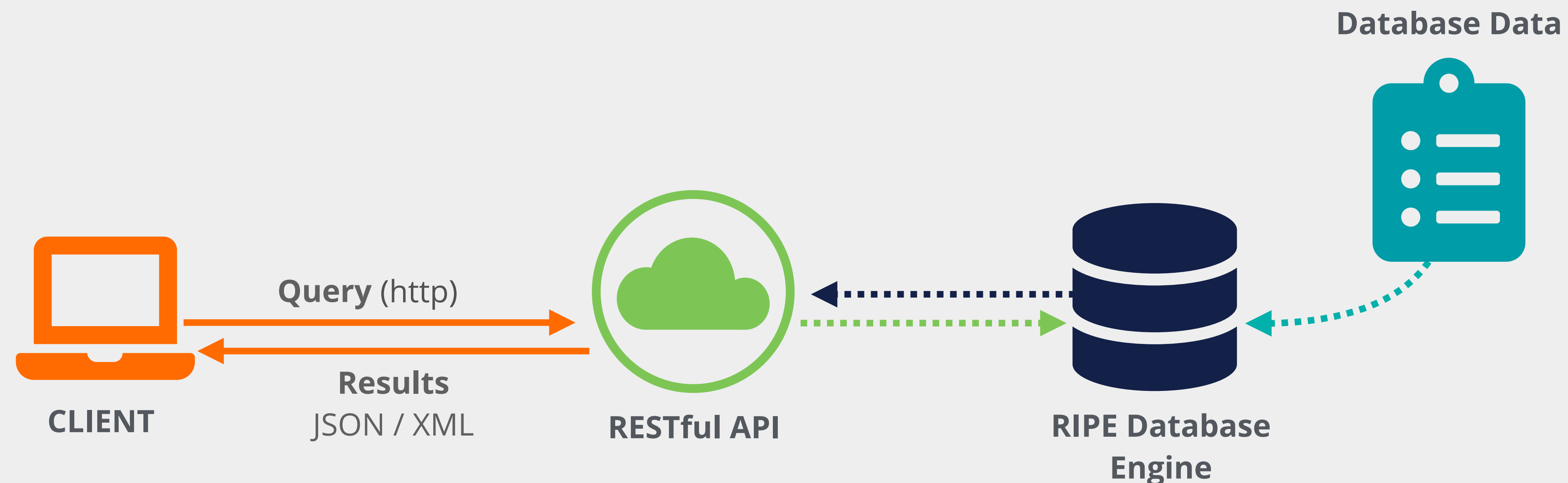
Beyond The Database

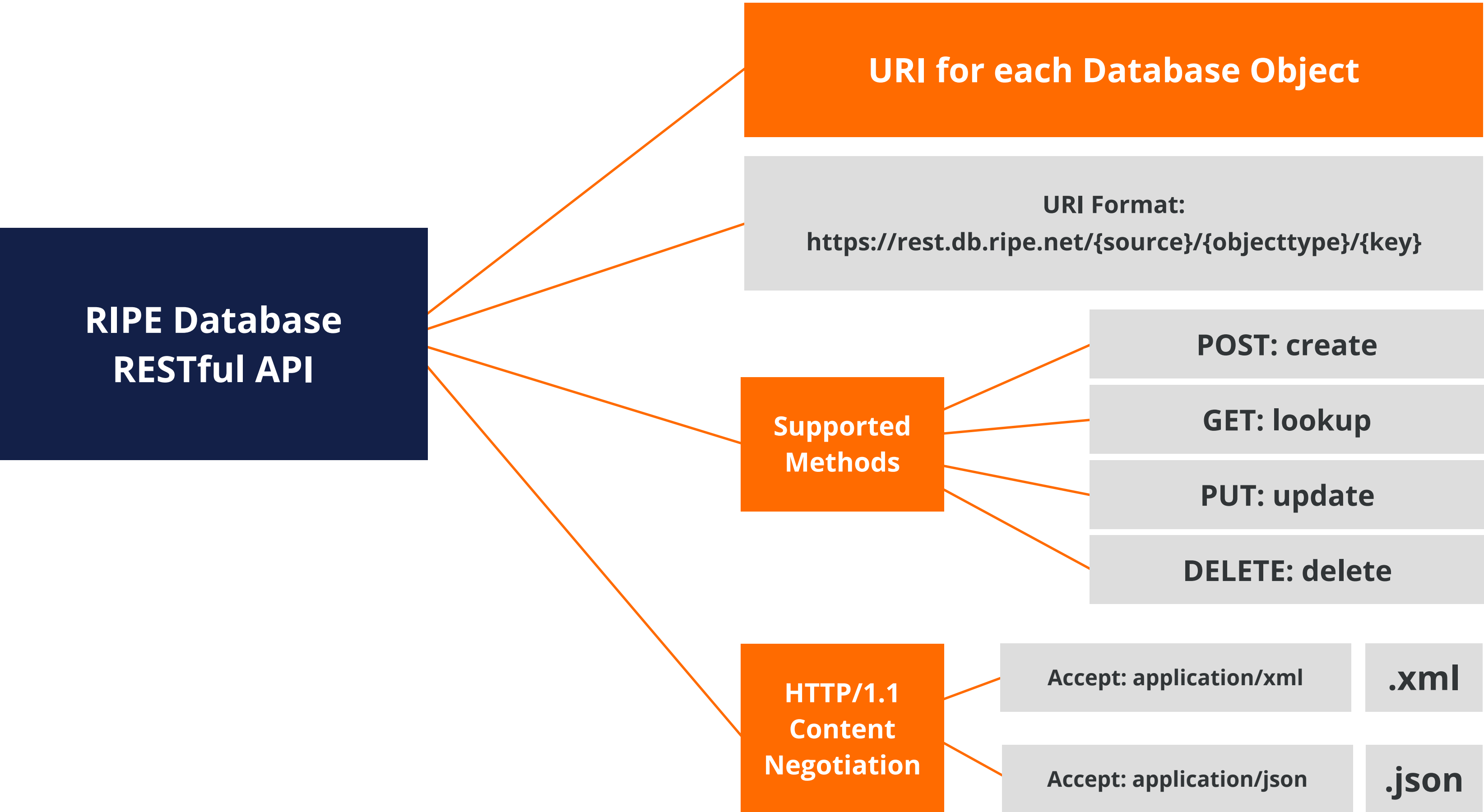
The RESTful API



RIPE Database RESTful API

- Allows **REST-compliant** systems to access the RIPE Database
- Data is exchanged in **XML** or **JSON** format
- Standard **query limits** apply

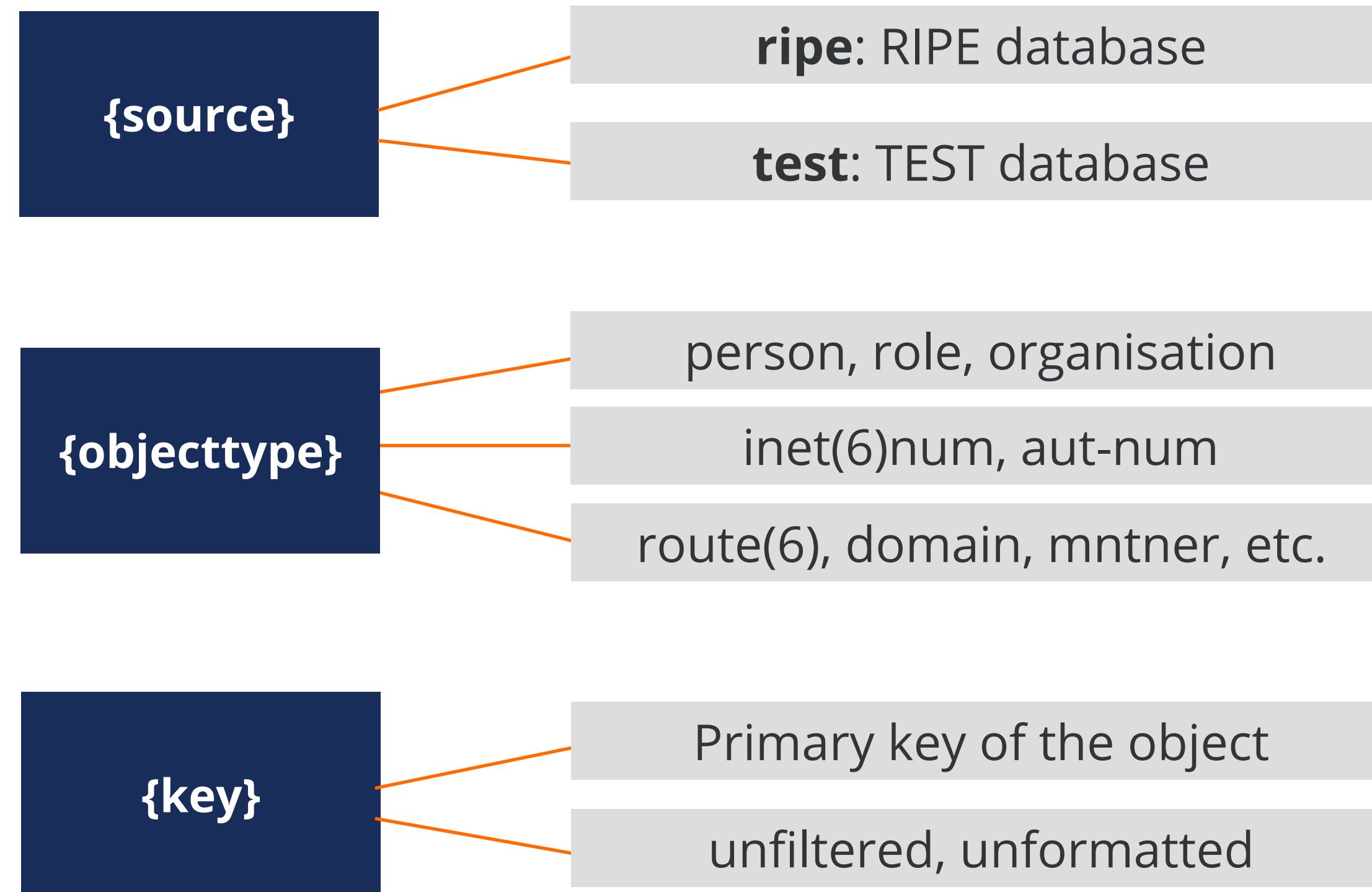






Uniform Resource Identifier (URI) Format:

`https://rest.db.ripe.net/{source}/{objecttype}/{key}`





Examples of URIs

Maintainer object RIPE-DBM-MNT (XML)

<https://rest.db.ripe.net/ripe/mntner/RIPE-DBM-MNT>

inetnum object for 193.0.0.0 - 193.0.7.255 (json)

<https://rest.db.ripe.net/ripe/inetnum/193.0.0.0%20-%20193.0.7.255.json>

Person object PP1-RIPE

<https://rest.db.ripe.net/ripe/person/pp1-ripe>

Additional Services



Search

RIPE Database whois search service

Metadata

List available sources
Object type template

Geolocation

Geolocation and language attributes for IPv4/IPv6 Address

Abuse Contact

Lookup abuse contact for Internet Resource



More Examples of URIs

Search for 'tp19-ripe' in the RIPE Database

<https://rest.db.ripe.net/search?source=ripe&query-string=tp19-ripe>

Show the template for the person object type

<https://rest.db.ripe.net/metadata/templates/person.xml>

Show the abuse contact email address for AS3333

<https://rest-test.db.ripe.net/abuse-contact/AS3333>

RESTful API Documentation



Get the documentation!



Link to documentation:

<https://github.com/RIPE-NCC/whois/wiki/WHOIS-REST-API>



Questions



We want your feedback!



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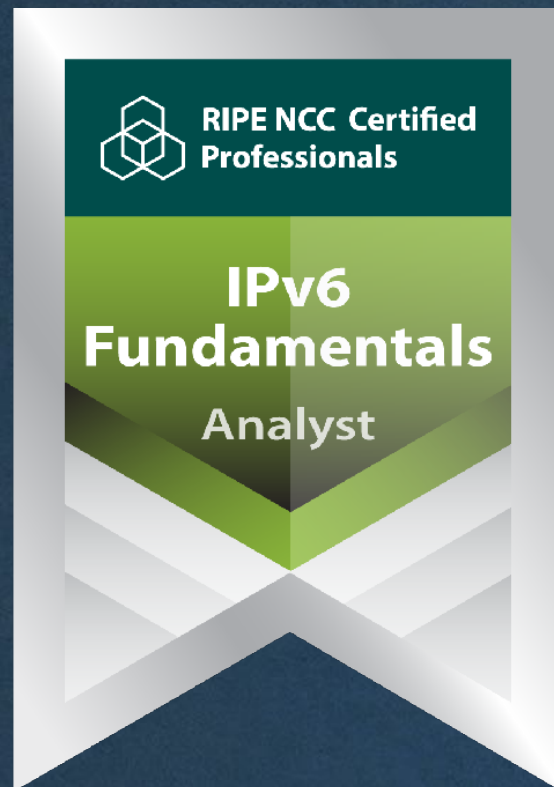


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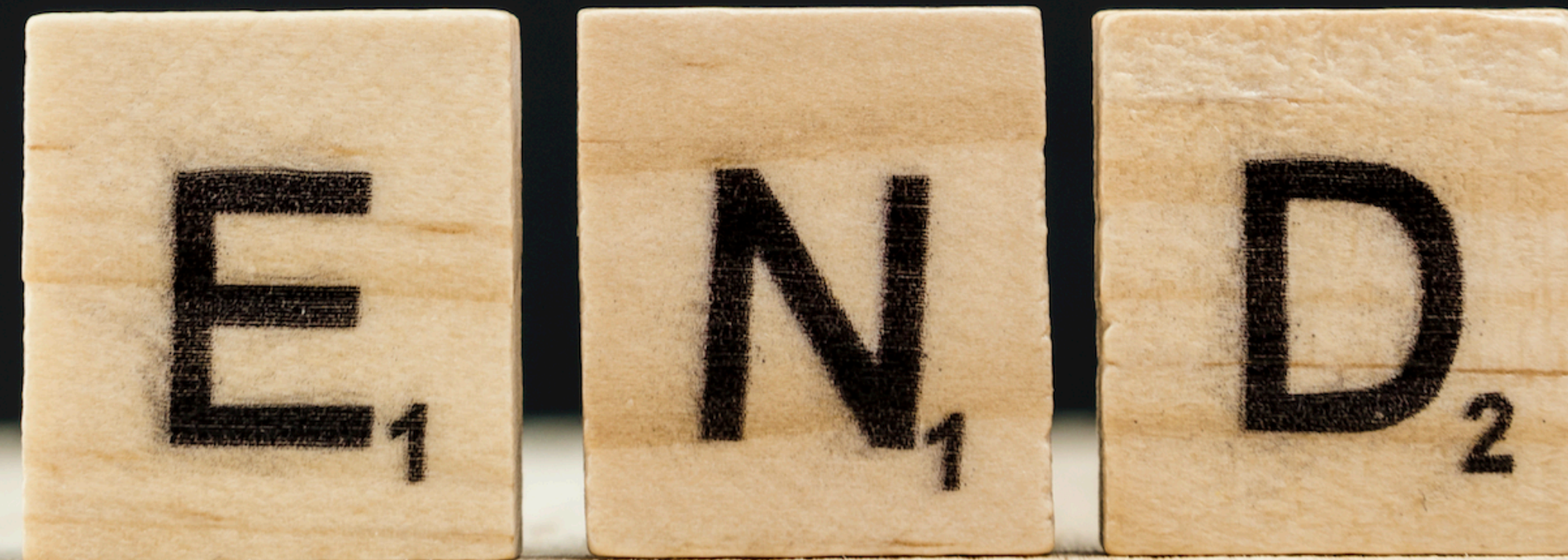
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What's Next in Internet Registry



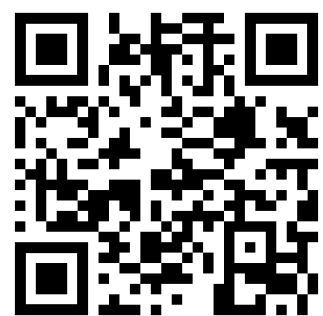
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